Amazing Science Facts

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Daniel Lemire is a full professor in computer science. His research is focused on indexing techniques and data science. For example, he works on bitmap indexes and integer-compression techniques. He also works on database design and probabilistic algorithms (e.g., universal hashing). He likes to debate and think about the effects of recent technology on our civilization.

His work on bitmap indexes is used by companies such as eBay, Facebook, LinkedIn and Netflix in their data warehouses within big-data frameworks such as Apache Hive, Druid, Netflix Atlas, LinkedIn

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The speed of light is finite

300 000 000 m/s

1 000 000 000 km/h

How fast is Google?

About 0.2 s

Montreal - Los Angeles

4 500 km

One-way 0.015 s

Two-way 0.030 s

Montreal - Australia

about 20 000 km

One-way 0.07 s

Two-way 0.15 s

Where does plant matter comes from?

Plants grow from a tiny seed to a large plant.

Where does this matter comes from?

From the air (CO_2)

If you lose weight, where does the mass goes?

If you eat less, you lose weight. Where does the mass goes?

In the air (CO_2).

When you burn wood, where does the energy come from?

Sun shines on trees, trees make wood. Energy from wood comes from the Sun.

Where does coal comes from?

We got forests that captured CO2. But we did not have bacteria to eat dead wood. They came much later.

So we accumulated layers and layers of wood. It has turned into coal.

Coal is solid carbon from CO2.

Where do you come from?

You come from a single cell from your mother.

All of your cells have the same genetic information.

All of the mother's cells come from a cell from your grand-mother's and so forth.

It goes all the way back to the origin of life (bacteria).

All our cells share the same DNA (genes)

your genes encode about 1 GB of data (easily fits in memory on a cheap phone).

Aging

Human beings age: they become less fit over time, more likely to die.

It does not affect all animals. Naked Mole Rats, lobsters do not lose fitness with time.

Many trees age in reverse: they become stronger over time.

People get smarter

Flynn effect: Intelligence of human population increases over time.

IQ measures intelligence. Average is 100.

IQ increases at a rate ranging from 0.2 to 0.4 each year. About 3 IQ points per decade.

People born after 2000 have a life expectancy > 100 years.

https://www.sciencedirect.com/science/article/pii/S0140673609614604

More people?

Population in Japan and Germany is decreasing.

Already a third of Japan is made of people 65 years or older.

Blind spot

There is a blind spot in our retina where the optic nerve connects.

80% of the matter in the universe is unaccounted for

We call it "dark matter". Nobody knows what it is made of.

How many cells?

You have 100 billion neurons (brain).

About 35 trillion cells in your whole body.

They all came from one of your mother's cell. Divided by two, then by two then by two.

Plus about 100 trillion bacteria. Most of your cells are in your digestive system (bacteria).

Power usage

A human body uses about 100 Watts. 20 Watts alone is for the brain.

Your brain uses about as much energy as a small lamp.

An iPhone battery could power your body for about 3 mins.

To learn more...

- Blog (twice a week) : https://lemire.me/blog/
- Home page : https://lemire.me/en/
- Twitter  @lemire