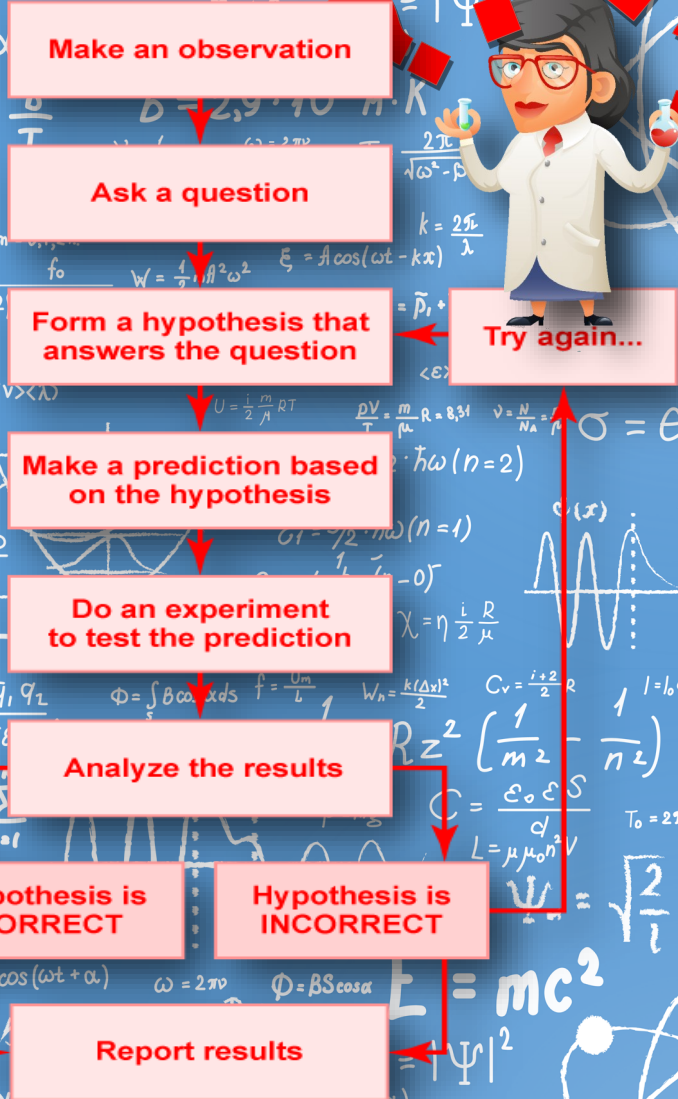


SCIENTIFIC INQUIRY OR THE SCIENTIFIC METHOD



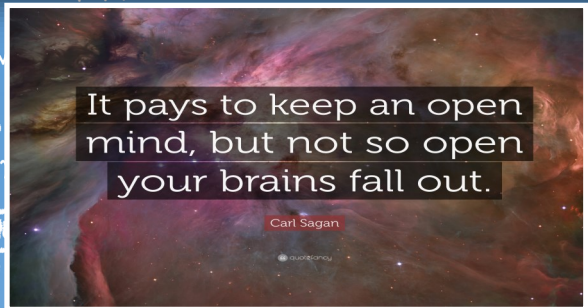
A Rough Guide to TYPES OF SCIENTIFIC EVIDENCE

Being able to evaluate the evidence behind a claim is important, but scientific evidence comes in a variety of forms. Here, the different types of scientific evidence are ranked and described, particularly those relevant to health and medicinal claims.

| | | |
|--|---|---|
| | ANECDOTAL & EXPERT OPINIONS | Anecdotal evidence is a person's own personal experience or view, not necessarily representative of typical experiences. An expert's stand-alone opinion, or that given in a written news article, are both considered weak forms of evidence without scientific studies to back them up. |
| | ANIMAL & CELL STUDIES <i>(experimental)</i> | Animal research can be useful, and can predict effects also seen in humans. However, observed effects can also differ, so subsequent human trials are required before a particular effect can be said to be seen in humans. Tests on isolated cells can also produce different results to those in the body. |
| | CASE REPORTS & CASE SERIES <i>(observational)</i> | A case report is a written record on a particular subject. Though low on the hierarchy of evidence, they can aid detection of new diseases, or side effects of treatments. A case series is similar, but tracks multiple subjects. Both types of study cannot prove causation, only correlation. |
| | CASE-CONTROL STUDIES <i>(observational)</i> | Case control studies are retrospective, involving two groups of subjects, one with a particular condition or symptom, and one without. They then track back to determine an attribute or exposure that could have caused this. Again, these studies show correlation, but it is hard to prove causation. |
| | COHORT STUDIES <i>(observational)</i> | A cohort study is similar to a case-control study, it involves selection of a group of people sharing a certain characteristic or treatment (e.g. exposure to a chemical), and compares them over time to a group of people who do not have this characteristic or treatment, noting any difference in outcome. |
| | RANDOMISED CONTROLLED TRIALS <i>(experimental)</i> | Subjects are randomly assigned to a test group, which receives the treatment, or a control group, which commonly receives a placebo. In 'blind' trials, participants do not know which group they are in; in 'double blind' trials, the experimenters do not know either. Blinding trials helps remove bias. |
| | SYSTEMATIC REVIEW | Systematic reviews draw on multiple randomised controlled trials to draw their conclusions, and also take into consideration the quality of the studies included. Reviews can help mitigate bias in individual studies and give us a more complete picture, making them the best form of evidence. |

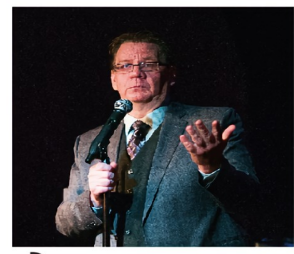
Note that in certain cases, some of these types of evidence may not be possible to procure, for ethical or other reasons.

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A LITTLE ABOUT YOUR PRESENTER

Born on the Southwest side of Chicago, William Pack got his first job in a magic shop at the age of 11. He is an award winning magician and storyteller, Victorian séance re-enactor, former card cheat, ex-casino surveillance, occasional author, and historian. His natural comedy and astonishing sleight of hand has made him a popular choice for banquet and party entertainment. Available for Corporate and Private events.



- PROFESSIONAL
- MEMORABLE
- ENTERTAINING
- FUN

WILLIAM PACK

MORE THAN MAGIC

Fermat's Library
@fermatlibrary

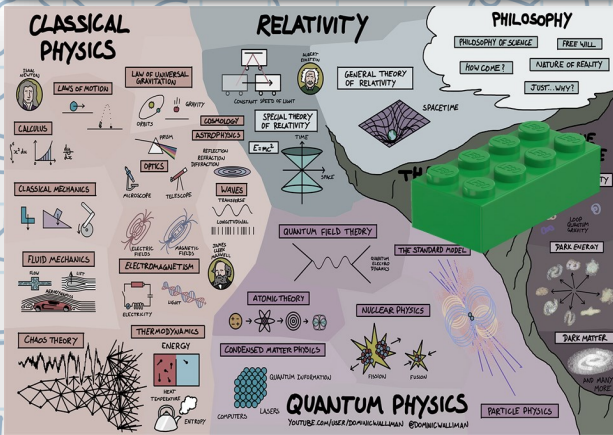
Here's a useful counterintuitive fact: one 18 inch pizza has more 'pizza' than two 12 inch pizzas

Area = $\pi(18/2)^2 = 254 \text{ in}^2$

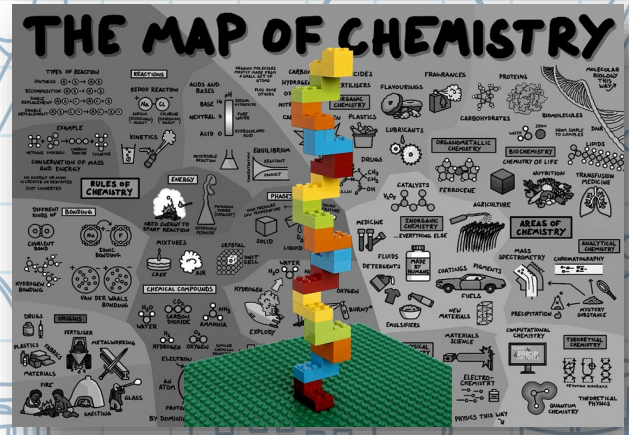
Area = $2\pi(12/2)^2 = 226 \text{ in}^2$

THINKING ABOUT THE UNIVERSE AS A LEGO WORLD

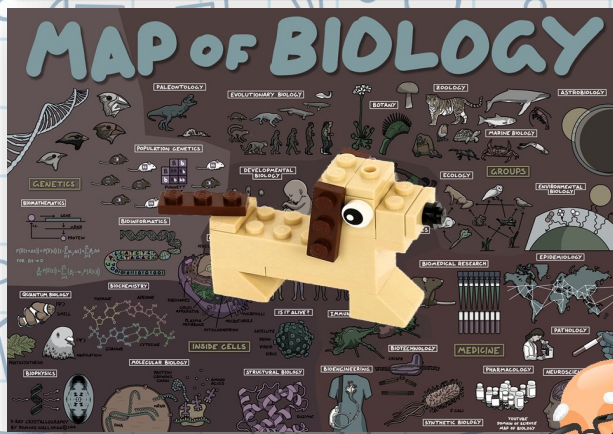
1. **PHYSICS** studies a single Lego and all of its properties, like how it moves around and its energy.



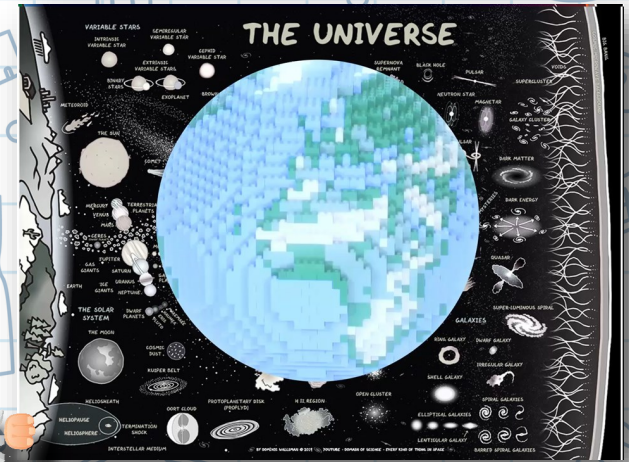
2. **CHEMISTRY** studies how Legos fit together to create larger things.



3. **LIFE SCIENCE (BIOLOGY)** studies all of the possible living things made out of Legos.



4. **EARTH SCIENCE** studies all the nonliving things in the Lego world.



SUGGESTED BOOKS

Falling Felines and Fundamental Physics
Gregory J. Gbur

Science Matters
Robert M. Hazen & James Trefil

At Least Know This
Guy P. Harrison

Understanding the Universe: From Quarks to the Cosmos
Don Lincoln

The Element in the Room
Helen Arney & Steve Mould

Does My Goldfish Know Who I Am? & Big Questions From Little People
Gemma Elwin Harris

Everything You need to Ace Science in One Big Fat Notebook: The Complete Middle School Study Guide
(Workman Publishing)

Everyday Amazing
Beatrice the Biologist

The Science Book
(Dorling Kindersley Limited)



SUGGESTED YOUTUBE CHANNELS TO SUBSCRIBE TO.

- Fermilab
- Amoeba Sisters
- AsapScience
- CrashCourse
- SciShow
- Vsauce
- Up and Atom
- DoS - Domain of Science
- (Domain of Science is where you can get those cool maps of Biology, Physics, etc)
- StarTalk
- The Science Asylum
- ScienceComedian
- William Pack



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