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Science Misconceptions

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Science misconceptions are a common misbelief, where a semi-truth or falsehood is perpetuated as scientific fact.

There are many reasons for misconceptions, many arising from bad science, but some from an oversimplification of the truth and others from urban myths that everybody thinks that they know.

Many people, even science teachers, do not fully understand the nature of science, and incorrectly portray the aims of research, and what science can actually achieve.

The main reason for this is that the philosophy of science is woefully neglected most scientific education curricula, and many scientists learn how to do experiments, but with little understanding of why, and the basic underlying processes defining the very nature of science.



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Common Science Misconceptions

For example, how many times, when you were a kid, did you see children's stories or schoolbooks with pictures of penguins and polar bears living happily at the North Pole? This is a misconception; polar bears certainly inhabit the arctic, but no penguin has ever been there - they only live in the Southern Hemisphere.

Another famous misconception is that water draining from the bath will drain anticlockwise in the northern hemisphere and clockwise in the southern hemisphere, due to the Coriolis Effect. This is untrue, but is perpetuated in scientific textbooks as fact. These are examples of science misconceptions that people are ingrained with and which they may carry on into adulthood.

Some misconceptions are understandable - either they oversimplify complicated concepts, or they over generalize [1].

In children, certainly, they often construct a view of the world and are reluctant to give it up, however much contrary evidence. This is a normal part of growing up to understand the world and understand the underlying principles.

The problem is that these views often remain, and are never reviewed, so many people leave school still possessing an incorrect view of the world.

Adult Science Misconceptions

More serious is when adults, often including scientists, take these misconceptions on board and propagate them as truth [2].

Sometimes, pseudoscience [3] becomes a misconception, where if something is publicized enough times, the general public believes it to be true.

One of the most common science misconceptions [4], still apparent in debate and in the media, is that science can provide ultimate proof, and that any process that science uncovers must be regarded as truth.

Science never achieves 'proof', even the most well known and basic principle is always subject to falsification [5], with even a single piece of evidence to the contrary able to destroy a theory.

Unfortunately, many experts still try to portray scientific findings as 'proof' or 'truth' [2]. Any well-trained scientist would never make such a mistake, which can have serious consequences.

For example, courtrooms are one area where jurors often believe that because an expert is a scientist, with a PhD, they know everything. This is not the case, and there is never an agreement within science, nor is science always right.

Accepted principles may change over time, and be replaced by new ones as a paradigm shifts [6].

A PhD does not a good scientist make, because they vary in quality and subject, although it is generally a reasonable guide. This has led to some serious miscarriages of justice, where jurors have taken the evidence presented by a science 'expert' as true and incorrectly convicted an innocent person.

The pediatrician, Roy Meadow [7], became notorious for incorrectly applying statistics [8] to Sudden Infant Death Syndrome, which led to countless mothers being incorrectly convicted of murder and neglect.

Science misconceptions can have grave consequences when lives and freedom are at stake, a long way removed from the polar bears example.

Science cannot answer anything, especially metaphysical questions about the existence of God, or the nature of ethics and morality. They are philosophical areas, and the creation debate is a good example.

Evolution cannot prove or disprove the existence of God, only give model about an underlying process in the universe. Neither can Intelligent Design - apart from being very shaky science, it uses the bible, the verification ^[9] of which can never be proved.

Source URL: <https://explorable.com/science-misconceptions?gid=1583>

Links

[1] <https://explorable.com/what-is-generalization>

[2] <https://explorable.com/truth-and-theory>

[3] <https://explorable.com/pseudoscience>

[4] <http://newyorkscienceteacher.com/sci/files/user-submitted/Misconception1.pdf>

[5] <https://explorable.com/falsifiability>

[6] <https://explorable.com/paradigm-shift>

[7] http://en.wikipedia.org/wiki/Roy_Meadow

[8] <https://explorable.com/statistics-tutorial>

[9] <https://explorable.com/verification-error>