



# Truth and Theory

The relationship between truth and theory is at the very heart of science, determining when, and if, a theory becomes accepted as reality.

Whilst most scientists and philosophers accept that absolute truth is unobtainable, there has been intense debate about exactly what constitutes proof.

This argument is closely related to the realism and antirealism debate [1], which questions the nature of reality.

Scientists gradually approach the truth, by refining and adapting theories, whilst understanding that they will never find perfect proof.

The scientific [2] theory involves making observations, and integrating them into previous research [3].

After a period of peer driven [4] acceptance, the theory will become 'scientifically proven'. To reach this level, a scientific fact must be reproduced, independently, by many scientists.

When enough scientists become convinced about the validity [5] of the results [6], they are assumed to be true.

As an example, whilst theoretical physicists generate elegant theories about what constitutes the underlying structure of the universe, empirical evidence [7] always takes precedence.

Even relativity, whilst regarded as scientifically proven, could fall down if enough contrary evidence is found. The boundary between truth and theory [8] is not clearly defined, relying upon scientific consensus and assumption.

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## Avoiding the Truth - Theory as a Tool

Science's way of skirting around the truth and theory issue is to set down a rigid protocol for an "accepted" truth.

The scientific method evolved [9], over hundreds of years, to ensure maximum accuracy. Without these guidelines, no progress is possible, and research becomes mired in philosophical debate.

Science never accepts that any hypothesis [10], or theory, is completely true. Theory is seen as a tool that is assumed true, until falsified [11].

Even if all of the steps of the scientific method [12] are followed, there is always a chance of error [13], or an incorrect basic premise.

The establishing of a scientific truth is often known as a paradigm [14], and the majority of research operates within these boundaries.

However, as data-collection becomes more accurate, or new information is uncovered, many theories often fail to match empirical observations [7]. This process becomes known as a paradigm shift [15], where an entire field of science changes direction.

## Truth and Theory - Conclusions

Scientists accept that, whilst repeated research, experimentation, and confirmation of results [16] will always approach the truth, theory can never *become* truth.

A theory is only ever assumed to be true until proved otherwise.

Generally speaking, there is no hard and fast rule to when a theory becomes 'accepted truth' but Kuhn's paradigm idea [14] is a decent fit. Scientific truth is implicitly assumed when an entire field, other than a few fringe scientists [17], reaches a consensus.

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**Source URL:** <https://explorable.com/truth-and-theory>

**Links:**

[1] <https://explorable.com/realism-and-antirealism>, [2] <https://explorable.com/what-is-the-scientific-method>, [3] <https://explorable.com/what-is-research>, [4] <https://explorable.com/peer-review-process>, [5] <https://explorable.com/validity-and-reliability>, [6] <https://explorable.com/statistically-significant-results>, [7] <https://explorable.com/empirical-evidence>, [8] <http://en.wikipedia.org/wiki/Truth>, [9] <https://explorable.com/history-of-the-scientific-method>, [10] <https://explorable.com/research-hypothesis>, [11] <https://explorable.com/falsifiability>, [12] <https://explorable.com/steps-of-the-scientific-method>, [13] <https://explorable.com/type-I-error>, [14] <https://explorable.com/what-is-a-paradigm>, [15] <https://explorable.com/paradigm-shift>, [16] <https://explorable.com/verification-error>, [17] <https://explorable.com/fringe-science>, [18] <https://explorable.com/users/martyn>, [19] <https://explorable.com/truth-and-theory>