



"I think you should be more explicit here in step two."

you flap your arms fast enough) can get you killed, while false positives may simply waste time and energy (crossing your fingers will bring good luck, breaking a mirror will bring bad luck, etc...).

Our brains are designed to pick out patterns, so we sometimes see patterns where they do not exist. Unplug the cable from your TV sometime and stare at the static. Stare long enough and you will begin to see the dots form lines, circles, maybe even letters and words. Our desire to make sense of the universe leaves us with a legacy of false positives: hallucinations become ghosts and aliens; knocking noises in an empty house become spirits and poltergeists; shadows and light in a tree, or burn marks on a tortilla, become the Virgin Mary.

Science is simply our attempt to gain a greater understanding of the universe, and our place in it, by weeding out the false positives. This is done by finding some test for an idea, one that will either prove or disprove the idea's validity. For instance, we can look at a nightly log of police arrest reports over a period of months to see if there is a correlation between the full moon and antisocial behavior.

Despite outlines you find in introductions to science texts, there is no specific form of the scientific method. In general the method consists of these steps:

- A. Observation and description of a phenomenon.
- B. Formulation of a hypothesis, or an explanation of the phenomenon (such as a causal mechanism or process, or a mathematical description).
- C. Use of the hypothesis to predict other phenomena/observations, such as the results of a test or experiment.
- D. Tests or experiments of these predictions, under controlled conditions, leading to acceptance or rejection or modification of the original hypothesis.

Introduction: the scientific method

Science is simply a formalization of normal thought processes that have allowed humans to survive thus far on Earth. We are curious creatures, born with no built-in knowledge of our environment, and everything we know must be learned. We are the descendants of beings who evolved with the ability to recognize connections between things and events in the environment (i.e., snakes with rattles should be avoided, white berries are probably poisonous, blue or black berries are probably edible, drinking salt water only makes you thirstier, etc...).

But causal thinking is not infallible, and we sometimes make connections whether they exist or not. False negatives (i.e., snakes with rattles are OK, bears are friendly and cuddly, you can fly if

The hypothesis must be falsifiable, that is, it must be possible to disprove it in some way. For instance, the existence of God can be proven (all you have to do is bring Him/Her/Them into class), but it cannot be disproved.

All data must be considered, not just that which supports the hypothesis. This is the most common fallacy in the modern world – we are anxious to support our opinions, whatever they may be, and we tend to listen only to the arguments and quote examples that support us.

A theory is a hypothesis that fits all of the available data better than any competing idea. It is worth noting here that this is not how we have become accustomed to using the word “theory.” It is common, on TV detective shows, for the hero to describe his hypothesis about the crime as a “theory.” In science, ideas are a dime a dozen, but you never hear anyone use the phrase “that’s just a theory.”