

The Role of Models in Science

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What is a model?



“Nothing is less real than realism. Details are confusing. It is only by selection, by elimination, by emphasis, that we get at the real meaning of things”, Georgia O’Keeffe (1887-1986)

What is a model?



The Role of Models

“All models are wrong, but some are useful”, George Box

Useful because without a model there is often only hand-waving. Attempts to go beyond data description without a model are not just “wrong”, one cannot even define what “right” means then.

“Art is not truth. Art is a lie that us makes realize truth”, Pablo Picasso

“Art is like a man walking barefoot up a mountain on rocks for so long he can’t feel his feet or the rocks. The purpose of art is to make the rocks rocky again. The technique of art is to make an object ”unfamiliar,” to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged. Art is a way of experiencing the artfulness of an object; the object itself is not important.”, Victor Shklovsky

The art of science includes selecting a model that captures essential features *for the purpose at hand* and allows one to justify an interpretation of a measurement. One can then speak clearly about whether the maintained assumptions are problematic, whether data allow precise measurement, what alternative assumptions might apply, etc.

“Perfection is achieved, not when there is nothing more to add, but when there is nothing left to take away”, Saint Exupery

“A model is a lie that helps you see the truth”, H. Skipper