



## Overview of the nature of science

Nature of science	Definition	Example	Mystery box
Scientific explorations are guided by <b>scientific theories</b> .	Scientists define research questions based on scientific theories.	Peter Higgs and other scientists proposed the Higgs boson, based on which future experiments were developed.	We devise experiments to test proposed theoretical models.
Science is <b>empirical</b> .	Scientists make direct observations of phenomena or indirect observations of secondary effects to support their claims.	Scientists observe what a newly discovered animal is eating. They gather data on its eating habits over several years.	We indirectly observe the inner structure of a mystery box by listening to a ball rolling inside.
Science is <b>inferential</b> .	Scientists interpret their observations based on scientific theories.	Palaeontologists infer the diet of dinosaurs from the observations of dinosaurs' anatomy and their digestive tracts.	We infer our own model of the inside structure based on observations of the mystery box.
Science is <b>creative</b> .	Scientists need to find creative solutions when doing scientific investigations.	As black holes are difficult to observe directly, eight telescopes worked together to make one picture of a black hole.	We create our own mystery box based on the model proposed.
Science is <b>tentative</b> .	Scientific knowledge is reliable and durable. It is never absolute or certain but evolves.	To date, there are many open questions regarding the functions of various genes.	After using the magnet, we update our theoretical model based on our detailed observations.
Science is a <b>social endeavour</b> .	Science affects and is affected by the social and cultural environment. The scientific community critically examines new ideas to ensure objectivity.	The discovery of the Higgs boson at CERN was presented to other scientists around the world on 4 July 2012.	We present our research and findings to the class and discuss the details with others.