

What are ‘Scientific Principles’ and ‘General’ Principles?’ⁱ

ABOUT SCIENTIFIC PRINCIPLES:

1. The principles of Mathematics and Science can be tested by anyone and anywhere to obtain the exact same results. When a Scientific Principle establishes that water boils at 100 degrees Centigrade at sea level, then in any country it can be tested to prove that when water is heated in a place located at sea level (meaning along the sea coast), it begins to boil on reaching the heat level of 100 degrees on the Centigrade scale of measuring heat. This fact can be verified by anyone at sea level to get the exact result whether in India or in France or in England.
 - 1.1 But certain conditions have to be fulfilled for all scientific principles to give the exact results. The **key condition** in this scientific principle is ‘**at sea level**’. But when the water is heated away from sea level, and at an altitude such as on a mountain, it will boil earlier, and at less than 100⁰ C. Therefore, to get the exact boiling point of water, say at Delhi, or Patna or anywhere away from sea level, it is **critical to know the altitude** of that place. How much higher is the place above sea level?
 - 1.2 Therefore, a sub principle to this scientific principle is that for every rise in altitude of 1000metres, the boiling point will drop by 1⁰ C. Therefore, at the peak of Mount Everest, which is at an altitude of 8,887 metres above sea level, the boiling point of water will be about 91.8⁰C.
 - 1.3 Therefore, a **key feature** of a Scientific Principle is **the certainty** of getting the exact same result universally, without limitation of space or time. This is possible because Science studies non living matter only. Two major areas of study in which scientific principles can be formulated include **study of non living Matter in Chemistry** and **study of Energy in Physics**.
 - 1.4 The second characteristic of a Scientific Principle is ‘precision’ which means that it can be stated with 100% certainty to be exact. This is because it deals with only inorganic / lifeless matter that only ‘re-act’. This reaction can be stated in Mathematical formulae such as $E = MC^2$. As the principles can be expressed in the language of mathematics, which is the recognized language of the universe, based on ‘Reason’

alone. There is no human emotion involved here. As such Scientific Principles have a quality of 'precision', like a clock work that shows precise time. Its theories can also provide frameworks of greater 'certainty'.

- 1.5 In all University level exams and all major competitive examinations, such as all those conducted by UPSC, and for IIM, IIT, CLAT, questions are loaded to test this level of in depth understanding of fundamentals and multiple dimensions.

ABOUT GENERAL PRINCIPLES IN SOCIAL SCIENCESⁱⁱ

2. In Social Sciences things relating to Life or living matter are studied. As life is too vast, too varied and too uncertain, it is unpredictable. Therefore Social Sciences General Principles are formulated on basis of theories, that allow for local variations and margins of error in the sample taken.
 - 2.1 Taking an example each from different disciplines in Social Sciences : Study of History shows that humans in different parts of the world, developed societies in different ways, but 'society' as a social group is common to all countries. Society as an organism that changes and grows is studied in Sociology. Economics and Finance study trade and value systems, finance and its instruments. Similarly, Political Science studies the political organizations of society in the form of government, along with theories attempting to explain what, how and why. Public Administration studies the actual functioning of governments.
 - 2.2 Due to variation in human behavior and nature, the General Principles in social sciences cannot claim that the principles will produce the exact same result. For example it cannot be said that a person 'A' in India will react or behave exactly as person 'B' in France or as person 'C' in any other country.
 - 2.3 'Emotions' that are a characteristic of all life forms, play an important role in Social Sciences. Inductive and Deductive Reasoning has a critical role in formulation of theories. Emotions differ and vary in every living being. Variation in human nature, emotions, reasoning

ability, allow for General Principles in Social Sciences to get formulated as broad principles that allow for local variations.

ⁱ Note: Please note the correct spelling for ‘principle’ here. This is different from ‘principal’ used in accounting for ‘Principal Amount’ and terms such as ‘School Principal’s Office’.

ⁱⁱ Socio Economic factors create institutions or result in their decline. The term ‘socio-economic’ is used in modern times in the study of Social Sciences, because economy is the key factor in any society. They are like two sides of the same coin that cannot be separated.