

Branches of Science

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- Fundamental Sciences
 - Empirical Sciences
 - ▶ Includes both Social and Natural sciences
 - ▶ Knowledge based on observable phenomena
 - ▶ Capable of being tested for validity, reproducibility
 - Formal Sciences
 - ▶ Mathematics, logic
 - ▶ Use a priori methodology
- Interdisciplinary and Applied Sciences
 - Medicine
 - Engineering

Empirical Sciences

- Natural Science
 - Branch of science that seeks to elucidate the rules that govern the natural world by applying an empirical and scientific method to the study of the universe.
 - Physical science – Physics, Chemistry
 - Earth science – Ecology, Oceanography, Geology, Meteorology
 - Life science – Biology, Zoology, Human Biology, Botany
- Social Sciences
 - Apply the scientific method to study human behavior, society, and social patterns
 - Contrast to Humanities that use a critical or analytical approach to the study of the human condition
 - "Social science" is commonly used as an umbrella term to refer to a plurality of fields outside of the natural sciences.
 - Anthropology, archaeology, business administration, communication, criminology, economics, education, government, linguistics, international relations, political science, psychology (especially social psychology), sociology and, in some contexts, geography, history and law

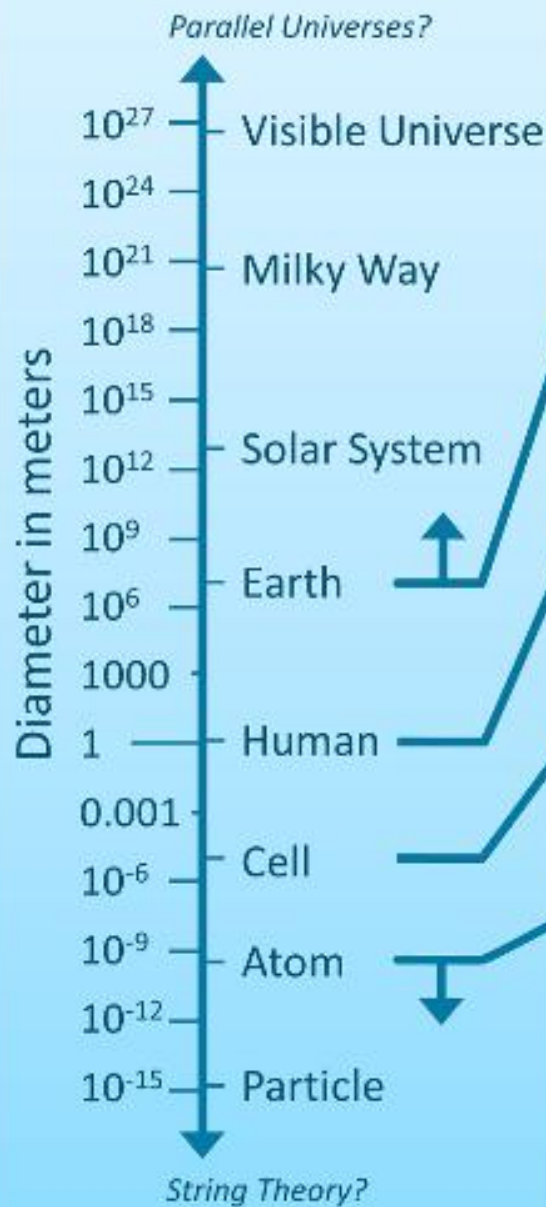
Formal Sciences

- Branches of knowledge that are concerned with formal systems
 - Logic
 - Mathematics
 - Decision theory** concerned with identifying the values, uncertainties and other issues relevant in a given decision, its rationality, and the resulting optimal decision.
 - Theoretical computer science
 - Information and systems theory
 - Statistics** is the study of the collection, organization, and interpretation of data including planning of data collection in terms of the design of surveys and experiments.
 - Some aspects of linguistics
- Not concerned with the validity of theories based on empirical knowledge, but the properties of formal systems based on definitions and rules
- Methods of the formal sciences essential to the construction and testing of scientific models dealing with observable reality
- Major advances in formal sciences have often enabled major advances in the empirical sciences (e.g. validity of observations from a case series)

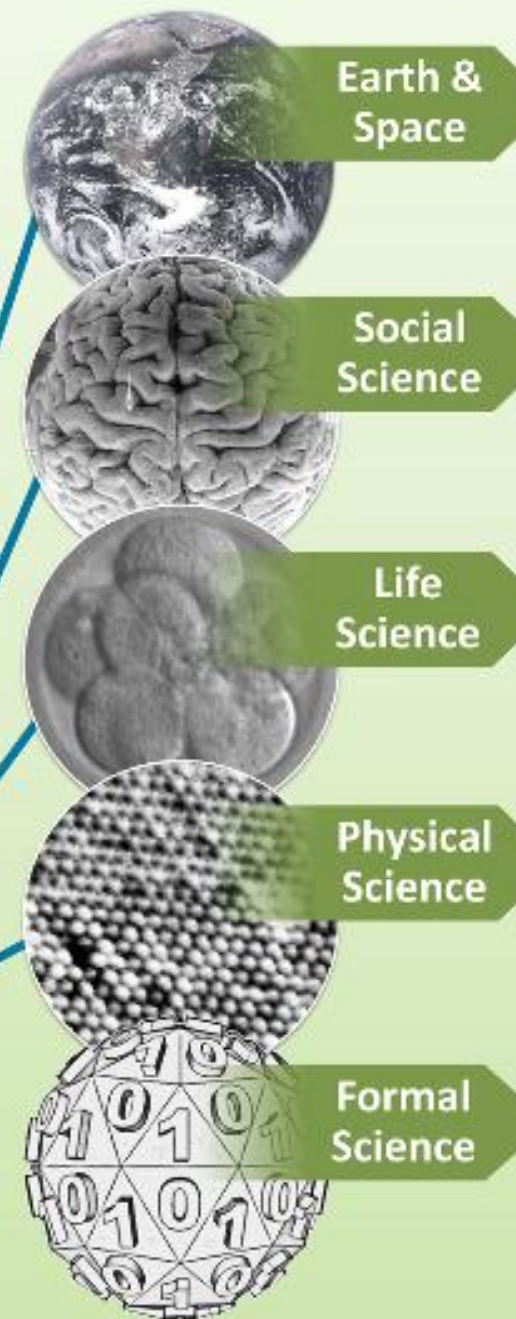
Applied Sciences

- Application of scientific knowledge transferred into a physical environment. Examples include testing a theoretical model through the use of formal science or solving a practical problem through the use of natural science.
- Applied science differs from fundamental science, which seeks to describe the most basic objects and forces, having less emphasis on practical applications.
- Medicine is derived from the Latin *ars medicina*, meaning the art of healing
 - Applied science related to the **art** of healing by diagnosis, treatment, and prevention of disease.
 - Contemporary medicine applies biomedical **sciences**, biomedical research, genetics and medical technology to diagnose, treat, and prevent injury and disease, typically through medication or surgery
 - Therapies include medications, surgery, psychotherapy, external splints & traction, prostheses, biologics, pharmaceuticals, ionizing radiation.

Scale of the Universe



Branches of Science



Hierarchy of Science

