

Science: systematized knowledge derived from observation, study, and experimentation carried on in order to determine the nature or principles of what is being studied

Science seeks natural causes for natural phenomena – doesn't deal with the supernatural

The conclusions of science make no pretense to being more than probable.

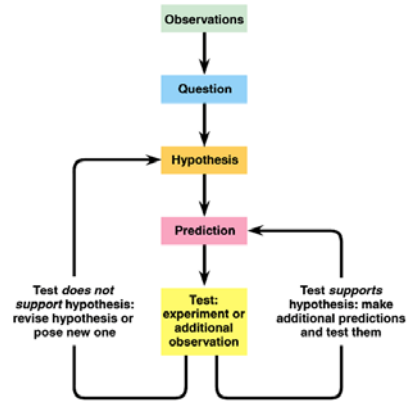
Charles Saunders Pierce

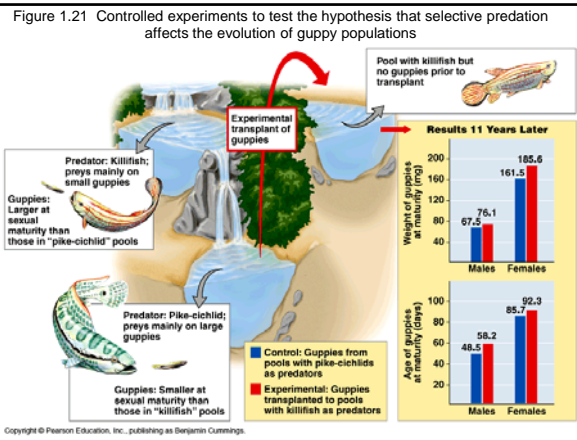
A well-corroborated hypothesis is as good as it gets in science.

Science Proceeds in Two Ways

- Discovery Science and Induction
 - Observations & measurements of natural world
 - Inductive generalizations from the observations
- Hypothetico-Deductive Science
 - Predictions made from generalizations
 - Predictions then tested against natural world (often in form of experiments)

Figure 1.19 Idealized version of the scientific method





Exp. 1 – Physical Environment

Hypothesis: differences in life-history characters due to physical environment

Prediction: guppies from different pops raised in similar environment will be similar

Experiment: maintain different pops in predator-free aquaria for several generations

Result: differences persisted for many generations → *hypothesis falsified*

Exp. 2 – Selection by Predators

Hypothesis: differences in life-history characters due to selection by predators

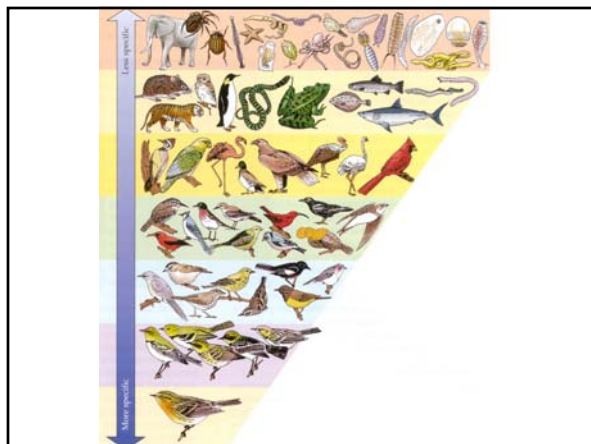
Prediction: changing predator type will select for different life-history characteristics

Experiment: guppies transplanted from pools with pike-cichlids to pools with just killifish

Result: after 30+ generations, transplanted guppies larger → *hypothesis supported*

Diversity of Life

- Over 1.5 million described species
- May be more than 30 million still undescribed
- Hierarchy in this diversity



The most-inclusive groupings are kingdoms

Traditional Classification

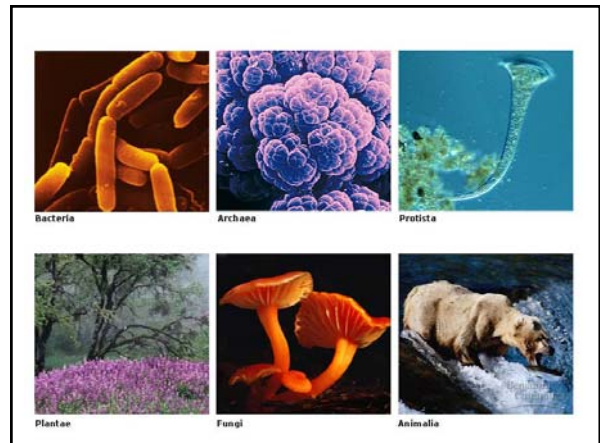
- Kingdom Plantae
- Kingdom Animalia

Whittaker's Classification (1969)

- Kingdom Plantae
- Kingdom Animalia
- Kingdom Fungi
- Kingdom Protista
- Kingdom Monera

Recent Classifications

- Kingdom Plantae
- Kingdom Animalia
- Kingdom Fungi
- Kingdom Protista
- Kingdom Bacteria
- Kingdom Archaea



Three Domains

- Domain Bacteria
- Domain Archaea
- Domain Eukarya

