CHAPTER 1: THE SCIENCE OF BIOLOGY

1.2 SCIENCE IN CONTEXT

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http://www.medicineamigo.com/disease/aids/index.html

EXPLORATION AND DISCOVERY: WHERE IDEAS COME FROM

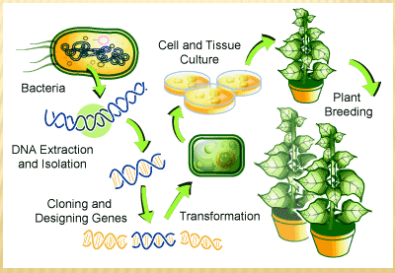
A. Scientific methodology is closely linked to **exploration** and **discovery**.
B. Scientific methodology starts with observations and questions.

EXPLORATION AND DISCOVERY: WHERE IDEAS COME FROM

C. Scientific Attitudes
   1. **Curiosity**: Asking questions,
   2. **Skepticism**: Questioning existing ideas and hypotheses, and refusing to accept explanations without evidence.
   3. **Open-mindedness**: Willingness to accept different ideas that may not agree with their hypothesis.
   4. **Creativity**: Need to design experiments that yield accurate data.

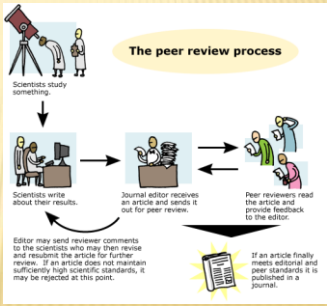
EXPLORATION AND DISCOVERY: WHERE IDEAS COME FROM

D. The Role of Technology
   1. Technology, science, and society are closely linked.



COMMUNICATING RESULTS: REVIEWING AND SHARING IDEAS

A. Peer Review
   1. Scientists publish in peer review journals.
   2. Reviewed anonymously by experts.
   3. Look for oversights, unfair influences, frauds, mistakes in reasoning.



COMMUNICATING RESULTS: REVIEWING AND SHARING IDEAS

B. Sharing Knowledge and New Ideas
   1. Published research can lead to new questions and controlled experiments.

http://www.bbc.co.uk/pressoffice/pressreleases/stories/2009/11_november/11/science.shtml

SCIENTIFIC THEORIES

A. Evidence can lead to a scientific **theory.**
   1. A <u>well-tested explanation that unifies a broad range of observations and hypotheses and that enables scientists to make accurate predictions about new situations</u>.
   2. No theory is considered absolute truth. Science is always changing – new information can change current thought.
      a. E.g.: Modern Atomic Theory, Kinetic Molecular Theory , The Germ Theory of Disease, The Big Bang Theory, The Theory of Evolution, The Theory of Gravity, Cell Theory, The Theories of Relativity, Plate Tectonic Theory, Quantum Mechanical Theory

SCIENCE AND SOCIETY

A. Science, Ethics, and Morality
   1. Science involves only natural phenomena. Not ethical or moral viewpoints.
   2. Science cannot answer questions about why life exists or what the meaning of life is.

SCIENCE AND SOCIETY

D. Avoiding Bias
   1. A particular preference or point of view that is personal, rather than scientific.
   2. Science aims to be objective, but scientists are human, too.
      a. Scientific data can be misinterpreted or misapplied by scientists who want to prove a particular point.

SCIENCE AND SOCIETY

E. Understanding and Using Science
   1. Don't just memorize today's scientific facts and ideas.
   2. Understanding science will help you be comfortable in a world that will keep changing,
   3. It will help you make complex decisions that also involve cultural customs, values, and ethical standards.