Environmental Biology
BS 105
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Environmental Science
at
Southeast Missouri State University

- B.S. degree in Environmental Science
  - Option areas in: Biology, Business, Chemistry, Environmental Health, Geoprocessing and Soils, and Policy and Communication
- Minor in Environmental Science
- Minor in Environmental Studies

Environmental Science
at
Southeast Missouri State University

Introduction to Environmental Biology

- Importance of Class Topic
- Sustainable Society Concept
- Nature and Process of Science

Environmental Biology

- Why is this class so important??
  - Environmental quality determines quality of life
  - Our actions today determine environmental quality for future generations

Environmental Biology

- Why is this class so important??
  - Can ONE individual make a difference?
    - YES!
  - How we each live our lives DOES make a difference
Environmental Biology

Why is this class so important?*

Relative Ignorance
↓
Awareness and Knowledge
↓
Interest and Concern
↓
ACTION

Environmental Biology

“There is nothing wrong with the planet. The planet is fine... Been here 4 1/2 billion years. We’ve been here, what, a 100,000 years, maybe 200,000. And we’ve only been engaged in heavy industry a little over 200 years. 200 years versus 4 1/2 billion. And we have the conceit to think that somehow we’re a threat?

The planet isn’t going away. We are.”
-- George Carlin

A Sustainable Society

meets its needs and fulfills its dreams

WITHOUT

jeopardizing the ability of future generations to do the same.

SCIENCE

- The Nature of Science
- The Process of Science
- Scientific Authority
- Science and Environmental Decision Making

The Nature of Science

What is Science?

Carl Sagan -- noted astronomer said

Science is a way of viewing the universe around us

The Nature of Science

- Science is one of the ways we view the universe
- Science is based upon testable explanations
- Science is a dynamic process
- Science relies upon *inductive reasoning* formulation of generalizations based upon observations
- Science does *not prove* ideas or generalizations
The Process of Science

The Scientific Method

Observation

Hypothesis

Test of Hypothesis

Accept Hypothesis

Reject Hypothesis

Scientific Explanations

- Hypothesis = tentative explanation that may be tested
- Theory = explanation that has been supported by many tests
- Law = explanation that seems to have no exceptions

Scientific Experiments

- Controlled Experiment – tests the effect of one variable, while holding other variables constant
- Controlled Variables – variables maintained constant, these could affect the dependent variable
- Independent Variable – the manipulated variable deliberately changed by the scientist
- Dependent Variable – the measured or responding variable in the experiment

Scientific Authority

QUESTION AUTHORITY !

Given complexity of modern scientific knowledge, one person’s “scientific authority” is limited to very narrow topic area(s).

- Person should have extensive background education, training and research experience in the particular topic
- Be aware of potential bias

Science and Environmental Decision Making

Should scientists make all the decisions about environmental issues?

NO!

Environmental issues are too complex and involve multiple aspects beyond the realm of science.

What should be the role of science in environmental issues?

Role of Science in Environmental Issues

The strengths of science should be utilized.

- Apply discipline-based expertise
- Make systematic observations – collect and analyze data
- Formulate and test hypotheses, develop theories
- Develop probabilistic statistical assessments
- Develop and utilize computer models
Who should play a role in Environmental Decisions?

Agriculture  Ethics  Science  Law  Economics
Labor  ENVIRONMENTAL  Industry
Special Interest Groups  Medicine  Engineering
Political Science

ALL OF US