

The Nature of Science





Draw a Scientist

On the white sheet of paper:

Write the date

Draw a scientist

DO NOT PUT YOUR NAME ON THE PAPER!

Connections

List all the characteristics you have in common with a beetle.





Biology (*bio + logos*)

The Study of Life
from biochemicals to ecosystems...

List some branches of Biology



Properties of Life

Cellular Organization

Reproduction

Metabolism

Homeostasis

Heredity

Responsiveness

Growth and Development

Seven Major Themes of Biology:



1. Cell Structure and Function

All living creatures are made of cells.

2. Reproduction

Organisms make more of their own kind.

3. Metabolism

Organisms carry out chemical reactions to obtain and use energy.

4. Homeostasis

Organisms maintain stable internal conditions.

[Visual Example of Homeostasis](#)

Online Textbook Visual Concepts





Seven Major Themes of Biology continued.....



5. Heredity

Organisms pass traits to their offspring through genes (carried in DNA molecules).

6. Evolution

Populations of organisms change over time. Natural selection is the driving force of evolution.

7. Interdependence

Organisms in a biological community live and interact with other organisms.

Ecology studies interactions of organisms with each other and the environment.



Biology in Your World

List five issues in Biology that you think are important.

Discuss in groups

Environment/Conservation

Food supply

Human genome

Genetic engineering

Disease/Health

Gene Therapy



Scientific Methods

Collecting observations

Asking questions

Forming hypotheses and making predictions

Confirming predictions (experiments as needed)

Drawing conclusions



Facts and Hypotheses.....

Fact

Hypothesis

Prediction

Law

Theory

Model



Experiments.....

Planned procedure to test a hypothesis

Control group and experimental group are exactly the same except for one factor

independent (manipulated) variable

Dependent (responding) variable

Collect and organize data

(charts, graphs)

Analyze data- is it reliable?

experimental *error*

Repeat test or devise new ones



Conclusions and reports.....

Drawing Conclusions

Induction

Deduction

Reporting results

In this class = a lab report

Scientific articles, conferences



Scientific Method Tutorial

Scientific Method

Tutorial

- Introduction
- Define the Problem
- Collect Information
- Formulate a Hypothesis
- Test the Hypothesis
- Draw a Conclusion

Cricket Experiment

- Introduction
- Define the Problem
- Collect Information
- Formulate a Hypothesis
- Perform the Experiment
- Draw a Conclusion

The steps of the Scientific Method are listed in the menu on the left. Clicking on a topic will take you to that part of the exercise. Use only the menu and buttons provided within the Scientific Method for navigation. Do not use the "Back" button of your browser. Click on the Tutorial or Cricket button to begin studying the Scientific Method.

Tutorial

Cricket