**Announcements**

1. Pick up handouts from table by door
2. Labs meet in SC-255 → Prelab Assignment due at start of lab
3. Pick up at GRCC Bookstore A.S.A.P.
   - *Essential Biology* by Campbell/Reece/Simon
   - *Do not* purchase the Biology 100 Lab Packet!
4. Reading
   - Course Outline/Syllabus
   - Chapters 1 and 2: focus on main ideas
5. ALE #1 due Friday

**Today’s Agenda**

1. Introduction to Course
2. Science as a Process
3. Case Study: Science or Pseudoscience?
   - *Prayer Study: Science or Not?*

**Topics Covered in this Course**

1. The process of science
2. How cells work
3. Molecular basis of genetics
4. How genes are passed from parent to offspring
5. Major theories of aging in humans and other living things
   - How to slow the aging process

**Major Emphasis in this Course**

1. Show relevance: how does science affect your lives
2. Understand how science works
3. Help you to learn on your own once you leave this class
4. Issues in Human Genetics and Cellular Biology

**THE PROCESS OF SCIENCE**

- The word *science* is derived from a Latin verb meaning “to know”
  - Science is a way of knowing
  - Science developed from our curiosity about ourselves and the world around us

**The Process of Science in Action**

**Good News for Nightlights** (Morning Edition, 3/10/00)

- NPR’s Vicky Que reports that according to a new study in *Nature* magazine leaving a nightlight in a toddlers room does not appear to lead to myopia later in life. This latest report contradicts an earlier finding that found a link between myopia and nighttime lighting in children younger than 2 years old. (3:25)
  - http://www.npr.org/ramfiles/me/20000309.me.04.ram
The Process of Science: "The Scientific Method"

Observe the Natural World
Ask Questions about what you see
Develop one or more testable hypotheses
Test the hypothesis
Communicate results

What's a Scientific Question?
Scientific Questions are....
1.
2.
3.
4.

Experiments of classical design

1. Individuals studied divided into two groups
   1. Experimental group
   2. Control group

What's a Hypothesis?
• Tentative, but untested explanations
• Make predictions that can be tested
  » Written as “If......, then......” statements

• Theories vs. Scientific theories vs. Hypotheses
  » what’s the difference?

How do you test a Hypothesis?
Via controlled experiments or pertinent observations
  » All variables must be controlled

Kinds of variables:
1. Independent variable
2. Dependent variable
3. Controlled Variables
**The Process of Science in Action**

- Estrogen and Cardiac Health (NPR’s All Things Considered, 4/3/00)
  Women who’ve reached menopause face a big decision... whether to take replacement hormones touted as being able to reduce the risk of heart disease and osteoporosis. But several recent studies have suggested that hormones may slightly increase the risk of heart disease. And now federal researchers are sending letters to women in a large trial saying that there does seem to be an initial increase in heart attacks and strokes. But the final word isn’t in... early data suggested that after two years, the extra risk may go away.

- [http://www.npr.org/rantfiles/atc/20000505.atc.08.nun](http://www.npr.org/rantfiles/atc/20000505.atc.08.nun)

**Why is Science self-correcting?**

1. Popular news reporting of current findings in science......
   - “In tomorrow’s edition of the New England Journal of Medicine......”
   - How much credibility should we give to recent findings?
2. Why do different researchers (or the same researcher!) get different and conflicting results while conducting what “same” experiment?

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**What is proof?**

1. When does a hypothesis become a theory?
2. Can theories be proven true?
3. What’s a scientific law?
4. Scientific Laws vs. Scientific Theories – what’s the difference?
5. “Knowledge is what’s left after you have demonstrated what cannot be true.”

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**Application of The Process of Science**

Read and Discuss the Case study:  
*Prayer Study: Science or Not?*