

## Class 1

In talking about the impact of ideas in one field on ideas in another field, one is always apt to make a fool of oneself. - Richard Feynman

If we convince ourselves that nothing can change, we don't have to risk acting on our dreams. - Paul Rogat Loeb, Soul of a Citizen

What is science?

1. Body of Knowledge
2. Methodology
3. Application
4. Curiosity/Appreciation/Commitment

Ecotourism

- " an on-site visit
- " conservation
- " interaction
- " mutually beneficial
- " cultural
- " problems = feasibility, opportunity

Definition of Ecotourism

1. Appreciate nature - active
2. Low impact - low waste, pollution, and effect on flora and fauna
3. Active contribution to community and conservation - often indirect financial support

## Class 2

Keystone species - has a greater impact in the ecosystem

Biodiversity - unexplained interconnections between species

Biodiversity can depend on water quality

Plants and animals lose certain properties when kept in captivity - many can't survive

CBL - data collection device

Sea Turtles

- " Archie Carr - worked local politics without irritating locals
- " Tortuguero - clearing house for sea turtle preservation - mostly Green
- " Pacuare Reserve - uses Costa Ricans to patrol beaches
  - " now uses student groups to patrol
  - " Alex and Colleen - research assistants
  - " Belinda - research director
  - " sea turtle conference
- " Leatherbacks

- " nest in April, May, and early June
- " excavations if there s a problem in the nest
- " turtles = exothermic
- " up to 2000 lbs. - giants
- " travel farthest, dive deepest
- " 45-80 eggs, 10-25 infertile eggs
- " 1/1000 hatchlings survive
- " 10-18 years - sexual maturity
- " 80 year life span

#### GPS - Global Positioning System

- " designed by US government for military
- " works worldwide (most of globe)
- " 24 satellites
- " received/processed with receivers (cost \$100-500 - catalogues, Wal-Mart, etc.)
- " tell latitude, longitude, elevation, speed if moving, distance, time
- " some give maps, points of interest, fuel stations
- " How GPS works - applied physical science
  - " formula:  $S = D/t$  or  $D = S \times t$
  - " S=speed of radio waves (300,000 km/sec)
  - " D=distance from satellite to you
  - " t=time it takes from satellite to receiver
- " GPS receivers measure distance from you to satellites in orbit
- " uses triangulation
- " we know satellite location - 11,000 miles up
- " we know t by comparing time signal was sent to time it was received, how long it took from satellite to you
- " we know S, speed of radio signal (300,000 km/sec) or 186,000 mi/s (speed of light)
- " exact time - vital
- " satellite and receiver generate signals called Psuedo random code
- " delay in timing of code from satellite compared to receiver = how time is measured
- " uses very accurate clock
- " tracks 4 satellites
- " GPS depends on direct line of sight to at least 3 satellites
- " doesn t work indoors, underground, underwater, or in a dense forest
- " Is it accurate?
  - " US government degraded the signal of consumer GPS
  - " they stopped May 1, 2000 - now accurate to 30-60 ft.
- " Uses
  - " navigation (cars, airplanes, camping, hunting, fishing)
  - " industry (construction, surveying, logging)
  - " science (locates position of lava flows, forests, endangered species)
  - " education (watershed study locations, modeling and triangulation, latitude and longitude, application of electromagnetic waves and technology, global politics)
- " [www.trimble.com/gps/](http://www.trimble.com/gps/)