Ecology

Biosphere: Global processes

Ecosystem: Energy flux and cycling of nutrients

Community: Interactions among populations

Population: Population dynamics; the unit of evolution

Organism: Survival and reproduction; the unit of natural selection
Ecology is NOT the same as environmentalism

• **Environmentalism** is a social movement dedicated to protect the natural world.

• **Ecology** is the scientific study of the interactions between organisms and their environments.
Ecology provides the basis for understanding and solving environmental problems.
Population Ecology

Populations vary from each other based on:

- Size
- Density
- Growth rate
Types of growth curves: J vs. S

1. Growth rate during exponential growth is greatest at the highest population level. TRUE OR FALSE

2. Growth rate is greatest in the logistic growth model at the highest population level. TRUE OR FALSE
Case: Sheep introduced in Tasmania

EARLY 1800's    Sheep introduced into Tasmania

3. What time of growth is observed in the first decades?
   A. Logistic or B. exponential

MID 1800's
4. Did this continue? A. yes    B. no

5. What is the carrying capacity of sheep in Tasmania?

6. Will the carrying capacity be the same for rabbits in Tasmania?
   A. The same as for sheep    B. Lower than the sheep    C. Higher than the sheep
HUMAN POPULATION

Can we keep this exponential growth?

What does population ecology tell us?

What is the carrying capacity for humans?

How can we calculate it?
Ecological Footprint: measures the amount of earth surface that an individual or a country needs

Size of land depends on:

- land to provide all resources a person needs
- land to dispose of all waste produced by a person
Ecological Footprints vary between countries

An average person in the US requires 9.7 ha =

<table>
<thead>
<tr>
<th>Country</th>
<th>Footprint (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americans</td>
<td>9.5</td>
</tr>
<tr>
<td>Canadians</td>
<td>7.8</td>
</tr>
<tr>
<td>Australians</td>
<td>7.1</td>
</tr>
<tr>
<td>Britons</td>
<td>5.3</td>
</tr>
<tr>
<td>Japanese</td>
<td>4.9</td>
</tr>
<tr>
<td>Germans</td>
<td>4.2</td>
</tr>
<tr>
<td>Chinese</td>
<td>2.1</td>
</tr>
<tr>
<td>Africans</td>
<td>below 1</td>
</tr>
</tbody>
</table>

Why do Americans consume more than others?

Why does it matter if some countries have greater footprints than others?
**Biocapacity**

the capacity of a given area to generate an on-going supply of renewable resources and to absorb its spillover wastes.

Unsustainability occurs if the area’s ecological footprint exceeds its biocapacity.
The size of the Ecological Footprint for each of us will determine the Earth’s carrying capacity for humans.
Is the size of our population the only issue to consider?

7. What are companies offering us more of? cheaper vs. quality disposable vs. reusable more packaging vs. less packaging
Study guide book

• Read chapter 53

• Test your knowledge: question 4 and 20