Section A: Intro to Ecology

"The wolves and moose of Isle Royale are known world-wide, and they are the focus of the longest-running study of a predator-prey system in the wild. Both species are relatively recent arrivals to Isle Royale -- moose apparently swam to the island and established a population in the early 1900s, and wolves followed decades later after traveling over the ice from Ontario, Canada in the late 1940s. Annual monitoring of wolves and moose began in 1958 when Durward Allen of Purdue University began an ambitious "10-year" study of the wolf-moose relationship. This study continues today, under the direction of John Vucetich and Rolf Peterson of Michigan Technological University." [http://www.nps.gov/isro/naturescience/ecological-studies-of-wolves-on-isle-royale.htm]

1. Why is this relationship important for scientists to study? [see how it changes over time + with different conditions]

2. After watching the video, 'The Wolves and Moose of Isle Royale', explain how the populations have been affected. [http://www.youtube.com/watch?v=PdwnfPurXcs]

Populations have declined due to climate change

Section B: Concept Check

Use the wordbank to match the definition with the term. (#1-8)

- Ecosystem
- Organism
- Biome
- Biosphere
- Abiotic
- Biotic
- Community
- Population

1. Living part of the environment [Biotic]
2. Collection of abiotic and biotic factors in an environment [ecosystem]
3. A single living thing that can breed/produce fertile offspring [organism]
4. Ecosystem with same climate and similar communities [Biome]
5. Individuals of the same species that live in the same area [Population]
6. Earth with all the ecosystems [Biosphere]
7. Different interacting populations that live together in an area [community]
8. Nonliving part of the environment [Abiotic]

9. Arrange these levels of organization in order from 1 to 4 starting with the simplest.

Organism Community Ecosystem Population

1, 3, 4, 2

10. Identify the level of organization.

a. Group of bats living in a cave [2]
   b. Red-eyed tree frog [1]
   c. Insects, fish and algae in a lake [3]
   d. An ocean [4]
Section C: Habitat vs. Niche

1. The red fox is a predator which feeds on the small mammals, amphibians, insects, and fruit. Red foxes are active at night. They provide blood for blackflies and mosquitoes, and are hosts to numerous diseases. The scraps, or carrion, left behind after a fox's meal provide food for many small scavengers and decomposers.
   a. Is this an example of the red fox's habitat or niche? Niche

2. The red fox occupies a niche in the meadow-forest edge communities. In other plant communities different species of animal may occupy a similar niche to that of the red fox. For example, in the grassland communities of western Canada and the United States, the coyote occupies a similar niche (to that of the red fox.)
   a. Explain what would happen if the two organisms tried to occupy the same niche in the same habitat. **One would become extinct**

2. What is the difference between a habitat and a niche? 
   **Habitat is place - niche includes feeding patterns + resource use**

**Index Card - Vocabulary: Get 7 index cards - one for each vocab word. Use this example as a guide to help create flashcards. **Vocab - organism, population, community, ecosystem, biome, niche, habitat

<table>
<thead>
<tr>
<th>(vocab word) Abiotic</th>
<th>(definition) nonliving part of the environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>rock</td>
<td>visual</td>
</tr>
</tbody>
</table>

Section D: Population Density (http://worldatlas.com/aatlas/populations/ctydensityh.htm)

1. Calculate the population density of the following countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (people)</th>
<th>Land Area (km²)</th>
<th>Density (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>32,805,000</td>
<td>9,976,140</td>
<td>3.29</td>
</tr>
<tr>
<td>China</td>
<td>1,306,313,800</td>
<td>9,596,960</td>
<td>136.12</td>
</tr>
<tr>
<td>Japan</td>
<td>127,417,200</td>
<td>377,835</td>
<td>337.23</td>
</tr>
<tr>
<td>India</td>
<td>1,080,264,400</td>
<td>3,287,590</td>
<td>328.59</td>
</tr>
<tr>
<td>Monaco</td>
<td>32,410</td>
<td>2</td>
<td>16,205.0</td>
</tr>
<tr>
<td>Spain</td>
<td>40,341,500</td>
<td>504,782</td>
<td>79.92</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>60,441,500</td>
<td>244,820</td>
<td>246.89</td>
</tr>
<tr>
<td>United States</td>
<td>295,734,100</td>
<td>9,629,091</td>
<td>30.71</td>
</tr>
</tbody>
</table>

2. What does population density indicate? **How crowded it is**