**Chapter 6 – Reading Questions (pp.151 - 161)**

1. When considering a population as a system, what 2 processes are inputs that increase population size and what 2 processes are outputs that decrease population size?

Input 1: Output 1:

Input 2: Output 2:

1. Five major characteristics help us understand how populations change over time:

|  |  |  |
| --- | --- | --- |
|  | Why is this factor important? | How could this factor apply to the New England forest in the Opening Story? |
| Population Size |  |  |
| Population Density |  |  |
| Population Distribution |  |  |
| Population Sex Ratio |  | Ecologists may study the percentage of female *Microrhopala vittata* beetles |
| Population Age Structure | Determines future growth potential (via individuals of reproductive age) |  |

1. Density-dependent factors & density-independent factors can affect population sizes and growth rates:
   * + - 1. True/false: Wildfires occurring in the Southern California chaparral (shrubland biome) influence populations of local species in a density-dependent way.
         2. What variable served as the limiting resource in Gause’s *paramecium* experiment?
         3. Explain how the carrying capacity (k) of an environment is determined:
         4. What are common limiting resources for terrestrial plants?

1. 2. 3.

* + - * 1. What are common limiting resources for animal populations?

1. 2. 3.

* + - * 1. True or false: Density-independent factors deal with limiting resources

1. The Exponential Growth Model
   1. What does the intrinsic growth rate (r) for a species measure?
   2. Chart the growth of the following population of mice at a growth rate of 10% per year:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year: | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Mice: | 100 |  |  |  |  |  |  |  |  |  |  |

1. The Logistic Growth Model
   1. Why is the exponential growth model usually insufficient to describe real populations?
   2. Why does population growth slow as it approaches the carrying capacity of its environment?
   3. What factors prevent the continued growth of populations beyond the carrying capacity?
2. Variations on Logistic Growth
   1. Why is population overshoot always followed by a die-off?
   2. True/false: during population overshoot, the environment’s carrying capacity increases.
3. Reproductive Strategies and Survivorship Curves
   1. Characteristics of k-selected and r-selected species:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Characteristics** | **Reproduction Speed** | **Likely to overshoot?** | **Example** | **Survivorship Curve Type** |
| **k-selected species** |  |  |  |  | Type I |
| **r-selected species** | Small, short lives, many offspring |  |  |  |  |

* 1. Which type of species can evolve faster? Explain why.
  2. True/false: Most organisms show strict k-selected or r-selected reproduction strategies
  3. Which type of species is at greater risk for extinction? Explain why.

**Chapter 6 Vocabulary List**

|  |  |  |
| --- | --- | --- |
| **Term** | **Description** | **Example** |
| Population density - |  |  |
| Population distribution - |  |  |
| Sex ratio - |  |  |
| Age structure - |  |  |
| Density-dependent factors - |  |  |
| Limiting resource - |  |  |
| Carrying capacity (k) - |  |  |
| Density-independent factors - |  |  |
| Growth rate - |  |  |
| Intrinsic growth rate (r) - |  |  |
| Exponential growth model - |  |  |
| Logistic growth model - |  |  |
| Overshoot - |  |  |
| Die-off - |  |  |
| k-selected species - |  |  |
| r-selected species - |  |  |
| Survivorship curves - |  |  |

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