AP Biology CH 53 **Name** _____
Population Ecology Study Guide
10ed

1. **What <u>two</u>** pieces of data are needed to mathematically determine *density?*
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2. **What** is the difference between *density* and *dispersion*?

3. A population ecologist wished to determine the size of a population of white-footed deer mice, *Peromyscus leucopus,*in a 1-hectare field. Her first trapping yielded 80 mice, all of which were marked with a dab of purple hair dye on the back of the neck. Two weeks later, the trapping was repeated. This time 75 mice were trapped, out of which 48 of the mice were marked. **Using the formula *N=mn/x,* what is the population of mice in the field? Show work.**

4. **Explain** the impact of *immigration* and *emigration* on population density.
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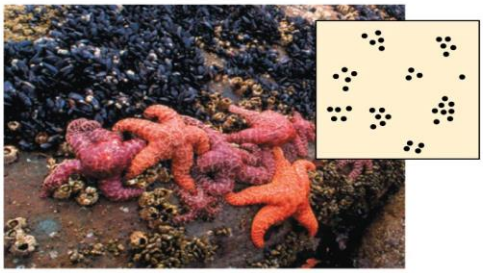
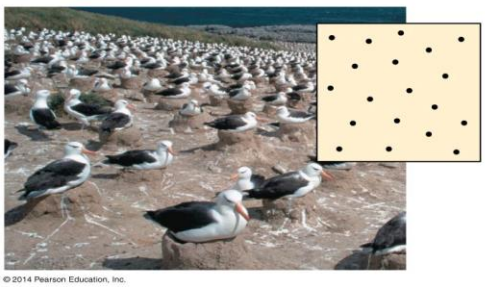
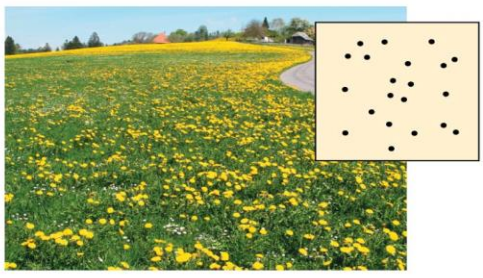
5. **Label** the dispersion pattern shown by each population in the following figure. Second, <u>and most important</u>, **what** do the dispersion patterns tell us about the individuals in the population and their interactions?



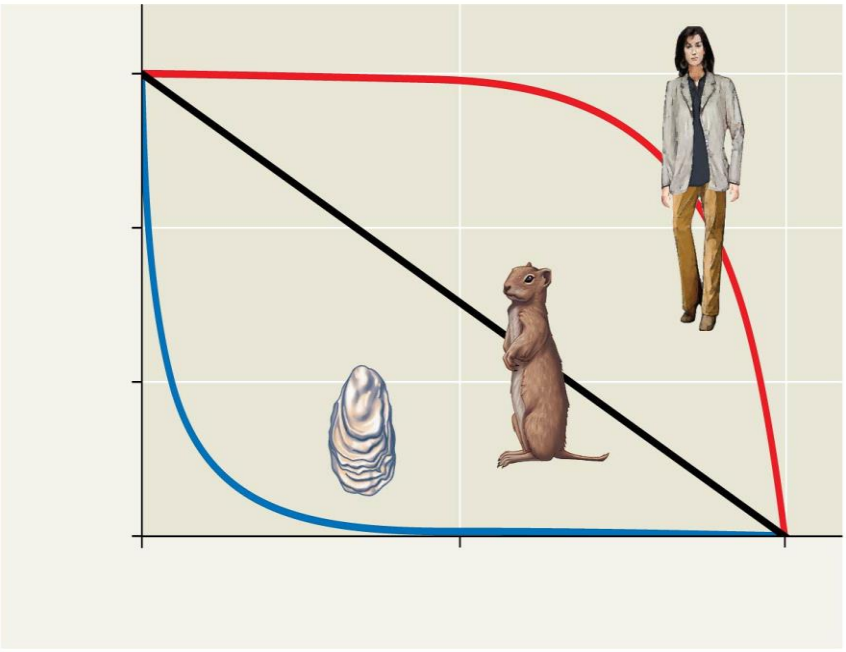




6. In **which** population statistics do *demographers* have a particular interest? **How** are these data often presented?

7. **Is** your biology class a *cohort?* **Explain**.

8. *Survivorship curves* show patterns of survival. Using the following figure, **label and explain** the three idealized survivorship patterns.



9. In the natural world, many species show survivorship curves that are combinations of the standard curves. **How** would an open nesting songbird's survivorship curve appear if it was Type III for the first year and then Type II for the rest of its life span? **Sketch** this curve on the survivorship curve graph in question 8.

10. **What** does a *reproductive table* show?

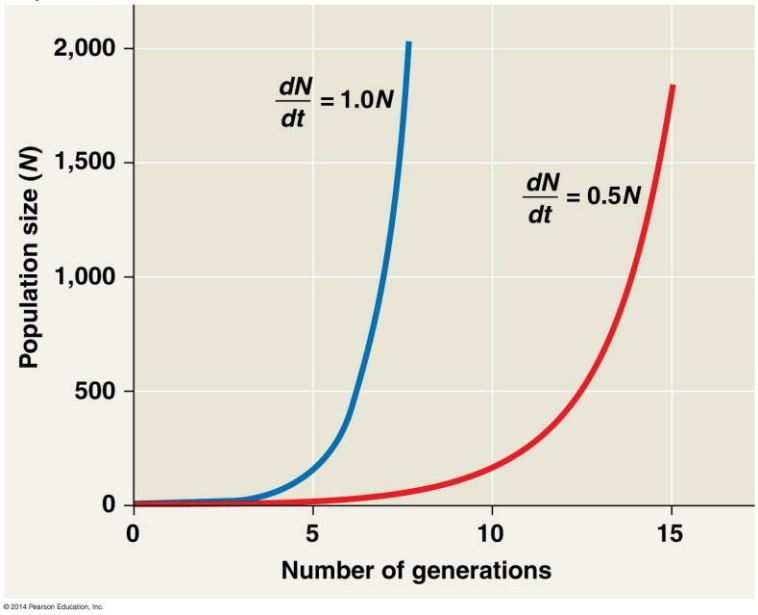
11. Study Figure 53.7, then decide **which** breeding female turtle laid the eggs in nest #74. **Justify** your response.

12. **Explain** the advantage to using per capita birth and death rates rather than just the raw numbers of births and deaths?

13. **What** will the per capita birth and death rates be if a population is demonstrating *zero population growth?*

14. **What** does it mean for a population to be in *exponential population growth?*

15. In the following graph, **explain** why the line with the value of 1.0 shows a steeper slope that reaches exponential growth more quickly than does the line with the value of .05\. **<u>On this graph, add a third line</u>** that approximates a population with an exponential value of 1.25.



16. **What** are the two examples of conditions that might lead to *exponential population growth* in natural populations?
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17. **Define** *carrying capacity?*

18. **List <u>six</u>** examples of limiting resources that can influence carrying capacity?
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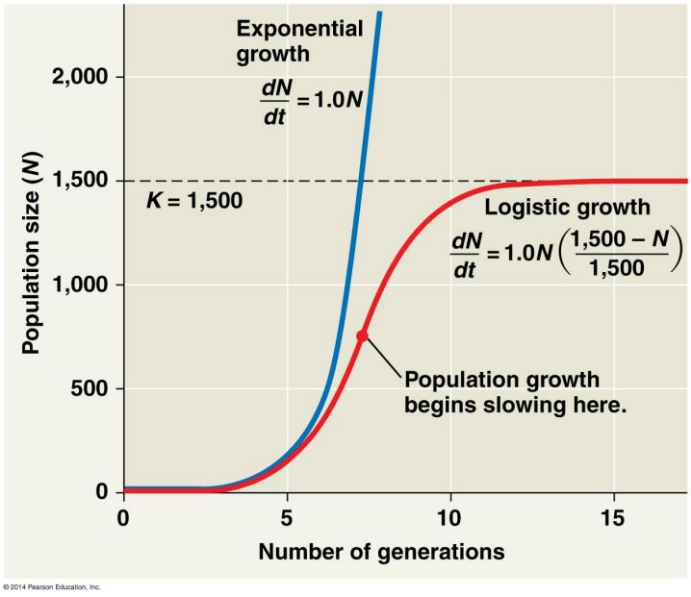
    -
    -
    -
    -
    -

19. In the *logistics population growth* model, the per capita rate of increase approaches zero as the _____is reached.

20. If the carrying capacity for (or *K*) is 1,000 and *N* is 10, the term *(K-N)/K* is large. **Explain** why a large value for *(K-N)/K* predicts growth close to the maximum rate of increase for this population.

21. In the following graph, **explain** why the logistic model predicts a sigmoid (S-shaped growth curve when the population density is plotted over time.



22. On **what** is the *life history* of an organism based?

23. **What <u>three</u>** variables form the life history of a species?
    -
    -
    -

24. **Explain** the difference between *semelparity (big-bang reproduction)* and *iteroparity (repeated reproduction)* as life history strategies.

25. **Explain** how two critical factors influence whether a species will evolve toward semelparity or iteroparity. Make sure to **list the two** critical factors in your discussion.

26. Refer to Figure 53.14 to **explain** the effect of offspring care on parental survival in kestrels.

27. **Explain** the ideas behind the creation of these two terms:

    ***K*-selection**

    ***r*-selection**

28. **Compare <u>and</u> contrast** these two terms:
    Density-independent regulation

    Density-dependent regulation

29. **Explain** how negative feedback plays an essential role in the unifying theme of regulation of populations. **Does** negative feedback play a role in both density-independent and density-depend regulation?
    Explain:

    Does it?:

30. Complete the following chart:

Negative Feedback Mechanism	**Explanation**	**Example**
Competition for resources		
Disease		
Predation		
Intrinsic factors		
Territoriality		
Toxic wastes		

31. **Explain** the *population dynamics* resulting from both biotic and abiotic factors that account for the fluctuations in the moose population on Isle Royale over the last 50 years.

32. **Explain** the importance of immigration and emigration in *metapopulations.*

33. Using Figures 53.22 and 53.20: **Summarize** human population growth since 1950. **Which** graph surprises you the most?

34. **Define** *demographic transition?* In demographic transition, **which** falls first, birth or death rates?

35. Using Figure 53.24 in your text, **describe** the key features for the three age-structure graphs and **predict** how the population of each country will grow.

Country	Key Features	Predicted Future Growth
Afghanistan		
United States		
Italy		

36. **Why** do *infant mortality* and *life expectancy* vary so greatly between certain countries?

37. **Can** the world's population sustain an *ecological footprint* that is currently the average American footprint? **Justify your response**.