AP BIOLOGY
ECOLOGY
ACTIVITY #3

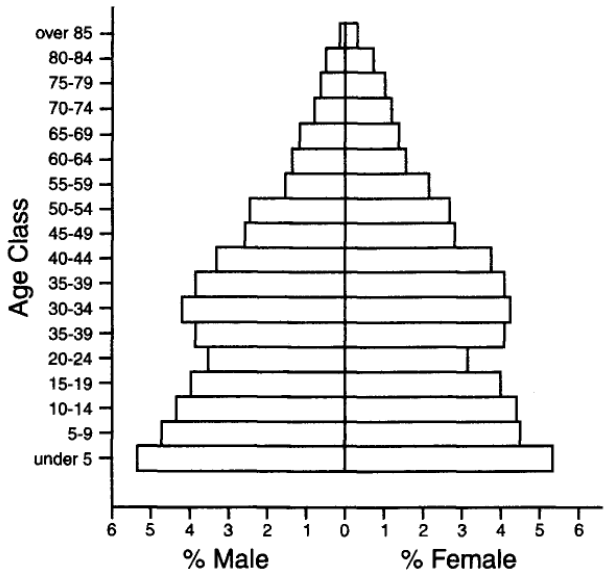
NAME_____

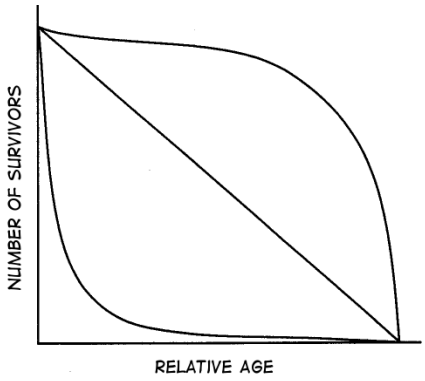
DATE_____HOUR____

POPULATION ECOLOGY

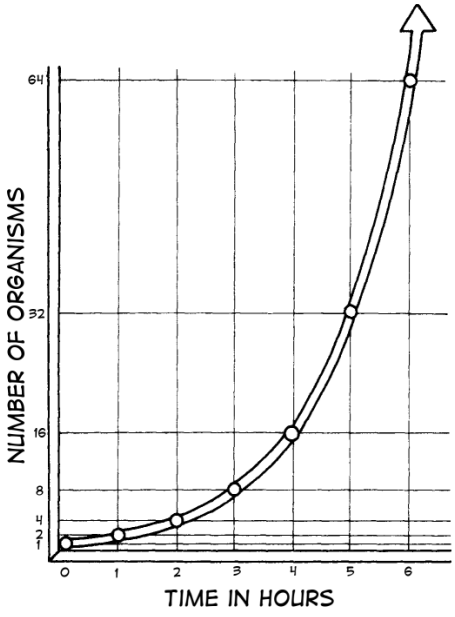
POPULATION

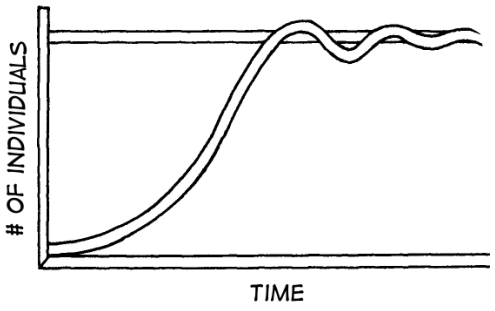
POPULATION CHARACTERISTICS





POPULATION GROWTH MODELS





QUESTIONS

1. Match the definition with the correct term

A. Demography
B. Density
C. Dispersion
D. Population

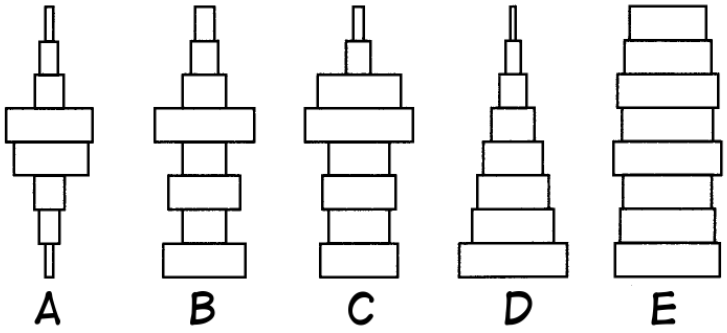
_____ Individuals of the same species that simultaneously occupy the same general area
_____ The number of individuals per unit area or volume

_____ Pattern of spacing among individuals within the geographical boundaries of the population
_____ Study of the vital statistics that affect population size

2. Identify the pattern of dispersal (**C**lumped, **R**andom, **U**niform) described in each of the following.

_____ Fish grouped together in a school
_____ Corn plants in a field
_____ Distribution of trees in tropical rain forests
_____ Unpredictable, patternless dispersion
_____ Rare in nature
_____ Evenly spaced
_____ Individuals aggregated in patches
_____ Humans in cities
_____ Trees in an orchard

3. Examine the age structure diagrams below.



a. Which of the above populations is experiencing the fastest growth? _____
b. Which is most nearly experiencing zero population growth over the time period represented? _____

c. Which is experiencing the effect of sever limiting factors? _____

4. Identify the survivorship curve (**I, II,** or **III**) described in each of the following.

_____ Most individuals survive to middle age; after that mortality is high

_____ The length of survivorship is random; the likelihood of death is the same at any age

_____ Most individuals die young, with only a few surviving to reproductive age and beyond

_____ Exhibited by humans and many large mammals that produce relatively few offspring but provide them with good care

_____ Relatively flat at the start, reflecting low death rates during early and midlife, and dropping steeply as death rates increase among older age groups

_____ Drops sharply at the left of the graph, reflecting very high death rates for the young, but then flattens as death rates decline

_____ Characteristic of organisms that produce large numbers of offspring but provide little care for them

_____ Oyster that produces millions of eggs

_____ Death rates more constant over life span

_____ Characteristic of some annual plants, invertebrates, some lizard species, and some rodents

5. Explain the following statement:
"Limited resources mandate trade offs between investments in reproduction and in survival."

_____

_____

_____

6. A population of 500 individuals experiences 55 births and 5 deaths during a one-year period.

   a. What is the reproductive rate for the population during this one-year period?

      _____

   b. If the population maintains the current growth pattern, what would a plot of its growth resemble?

      _____

7. Identify the population growth model (**E**xponential or **L**ogistic) described in each of the following.

_____ Describes an idealized population in an unlimited environment

_____ Modified to incorporate changes in r as population size grows toward carrying capacity

_____ Produces a sigmoid (S-shaped) curve when population size is plotted against time

_____ Produces a J-shaped curve when population size is plotted against time

_____ Occurs when limiting factors restrict the size of the population

_____ $\frac{\Delta N}{\Delta t} = rN$

_____ $\frac{\Delta N}{\Delta t} = rN\left(\frac{K - N}{K}\right)$

8. What are the two types of life-history strategies?

_____

9. Identify each of the following as true of **K**-selected species or **r**-selected species.

_____ Exhibit rapid growth

_____ Population size remains relatively constant (at the carrying capacity)

_____ Species that quickly invade a habitat, quickly reproduce, and then die

_____ Opportunistic species

_____ Grasses and many insects

_____ Produce a small number or relatively large offspring that require extensive parental care until they mature

_____ Small, mature quickly, and require little, if any, parental care

_____ Large mammals

10. What impact do limiting factors have on a population?

_____

_____

11. What are the two categories of limiting factors?

_____

12. Identify each of the following as true of density-dependent (**D**) or density-independent (**I**) limiting factors.

_____ Factors whose limiting effect becomes more intense as the population density increases
_____ Factors that affect a population regardless of its size

_____ Natural disasters

_____ Parasites and disease

_____ Competition for resources

_____ Predation

_____ Extreme climates

13. Describe the graph of the population growth of humans on Earth.

_____

Why hasn't the population of humans on Earth leveled off or reached carrying capacity?

_____

_____

_____

_____

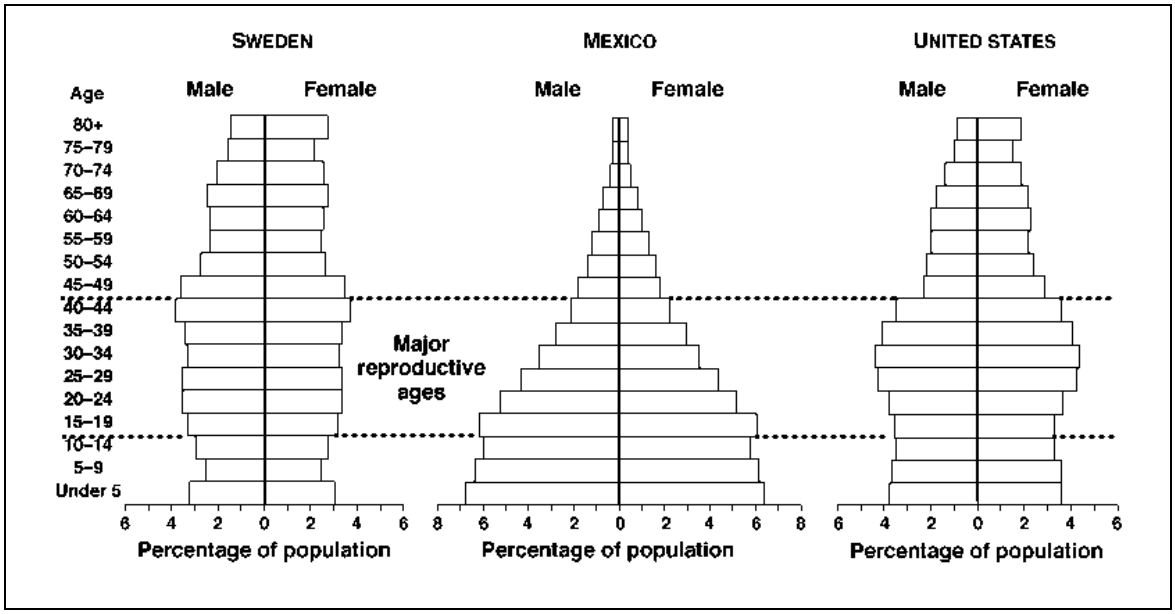
Eventually, provided human population growth follows that of other populations, what will happen to the population of humans on Earth? Why?

_____

_____

_____

14. Examine the age structure diagrams below. This data reflects information collected in 1990.



Identify the age structure diagram described in each of the following.

Description	**Country**
Population is predicted to increase dramatically	
Population is relatively stable	
Population is declining	
Survival of older females is higher than older males	