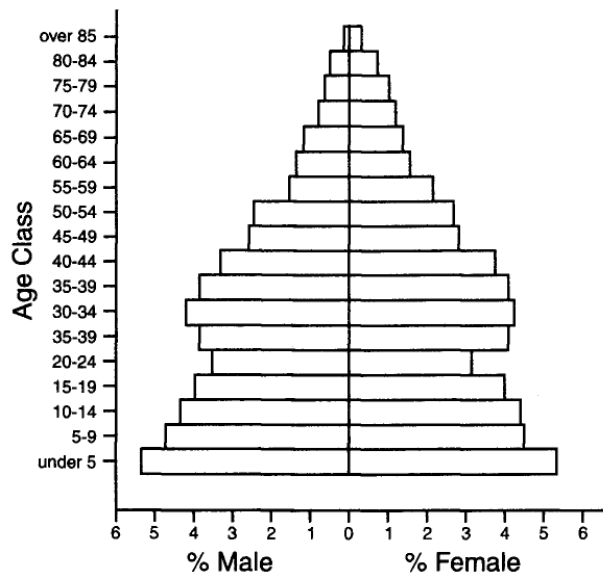
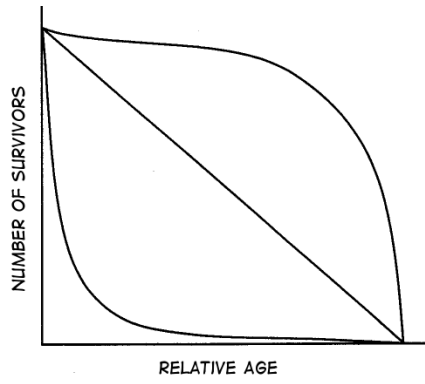


POPULATION ECOLOGY

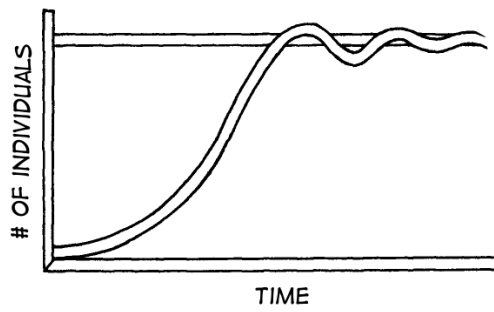
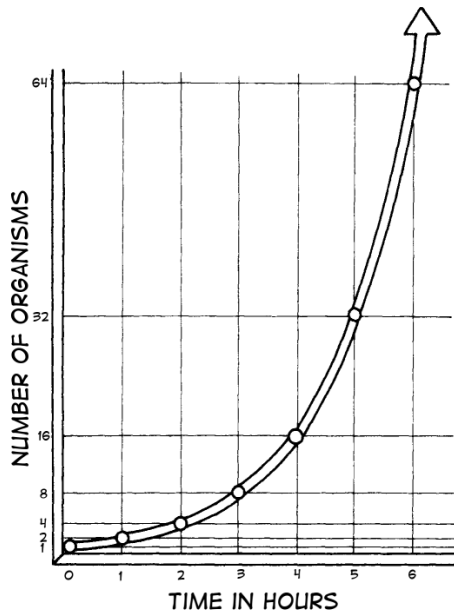
POPULATION

POPULATION CHARACTERISTICS





POPULATION GROWTH MODELS



QUESTIONS

1. Match the definition with the correct term

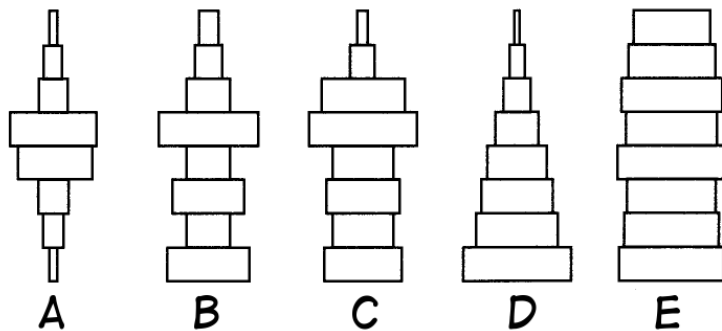
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|---------------|---------------|
| A. Demography | C. Dispersion |
| B. Density | D. Population |

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

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

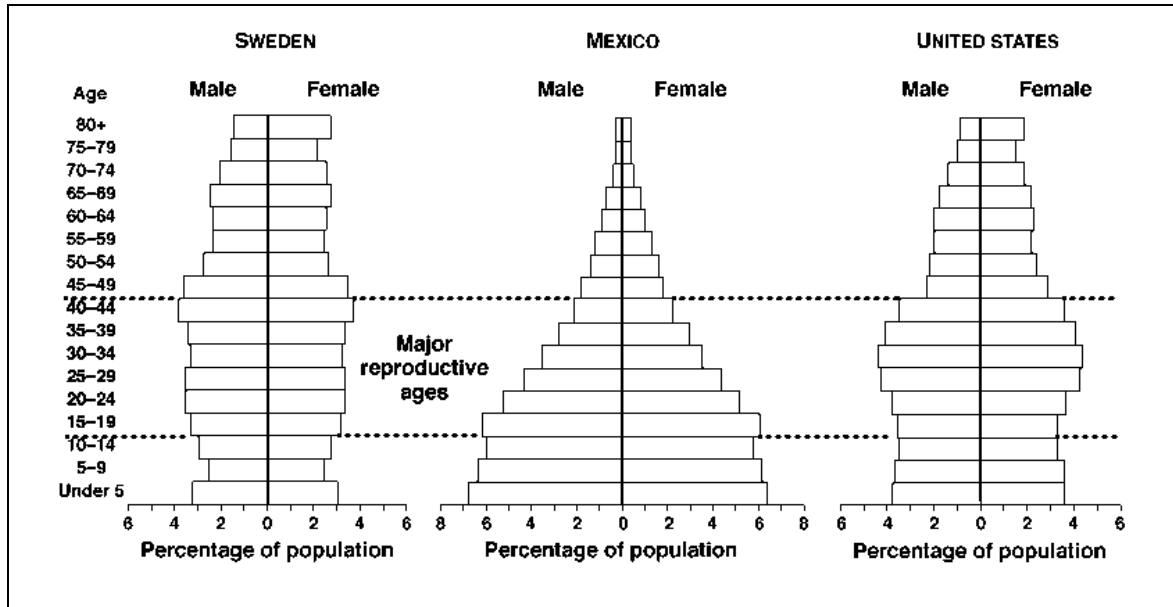
_____ Extreme climates

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	