

BILD 3 Final Review

HW Review

A recessive gene causing a lethal disorder is present in a large, random-mating human population. If the frequency of the recessive allele is 0.01, what is the approximate frequency of the disease?

$$a = 0.01$$

$$\text{Therefore } a^2 = 0.0001$$

$$1 \text{ in } 10,000$$

HW Review Cont

In the same population as the previous question, approximately what proportion of the population carries a copy of the recessive disease allele, but does not have the disease. Choose the closest

Determine $2pq$. approximation:

$$q = 0.01 \text{ so } p = 0.99$$


$$2pq = 2(0.01)(0.99) \sim 2(0.01)(1) = 0.02$$

$$2/100 = 1/50$$


6. Which of the following is not true with respect to mutation:

- A. mutations are random with respect to adaptation.
- B. most mutations are slightly deleterious (or nearly neutral).
- C. mutation is the ultimate source of variation.
- D. mutations have a larger effect in larger populations.
- E. synonymous mutations have no effect on amino acid sequence.


12. If individuals from differing populations overcome prezygotic reproductive barriers, additional postzygotic barriers may prevent the formation of stable hybrids. Which of the following statements regarding postzygotic reproductive barriers is false?

- A. Genetic differences may reduce survival and reproduction of hybrid offspring.
-  B. If hybrids survive, they will ultimately form stable species.
- C. Hybrids may mature normally, but be infertile.
- D. Hybrid offspring may have reduced survival.
- E. Hybrid zygotes may fail to mature normally.

17. A scrub jay forgoes her own breeding to help another pair breed. To maximize her inclusive fitness, should she choose to help her sister or her mother, and what term best describes this type of behavior?

- A. Mother, altruistic
- B. Sister, altruistic
-  C. Doesn't matter, altruistic
- D. Mother, cooperative
- E. Sister, cooperative

23. If young do not disperse far from their birth site, the spatial distribution of individuals is expected to be:

- A. evenly distributed
-  B. clumped
- C. unpredictable
- D. random
- E. hyperdispersed


27. Which one of the following organisms best exhibits a survivorship curve of high mortality rates among young individuals?

among young individuals?

- A. elephants
- B. humans
-  C. birds
- D. annual plants
- E. whales

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_____ 25. The mating system of the elephant seal is based on polygyny -- one male mating with more than one female. Which of the concepts described below best describes the following situation: A male elephant seal cannot search for food when he is defending his section of the beach.

- A. Benefit
- B. Energetic cost
-  C. Opportunity cost
- D. Risk cost
- E. Foraging cost

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You come across a population of hummingbirds.

34. The first thing you notice is that some males are exhibiting a dramatic behavior: they repeatedly fly very high into the sky, then dive straight for the ground only to make a “U-turn” right in front of perched females. Females choose the best acrobats to mate with.

Name 3 kinds of costs and provide an example of each from the male hummingbird’s behavior. (6pts)

Answer

Energetic – energy for acrobatics
Opportunity – could be spent getting food
Risk – more likely to get caught by predators

Is carrying capacity (k) a constant value? If not, how can it change?

No, changes when habitat changes

What are some causes of extinction?

Explain why each is a threat.

Habitat loss

Exotic species

Overexploitation

Pollution

Disease

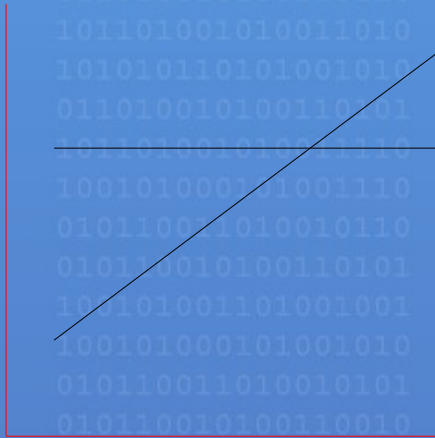
4. Draw 3 graphs with rate on the y-axis and density on the x-axis.

a. Birth rate is density-independent but death rate is density dependent (high death rate at high density)

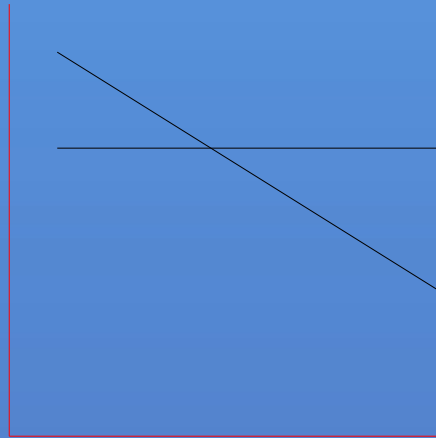
b. Birth rate is density-dependent (high birth rate at low density) and death rate is density-independent

c. Both birth and death rates are density dependent

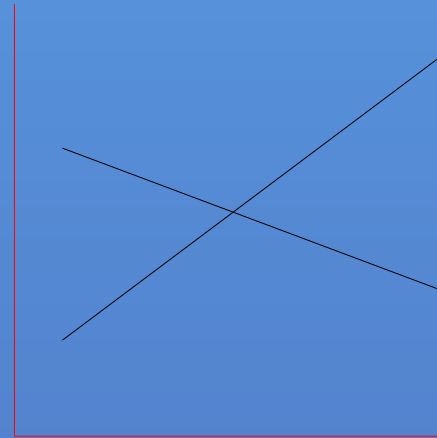
Answer



A



B



C

Describe how evolutionary forces may act against each other.

A. natural selection and sexual selection

Preference versus practicality

B. migration and natural selection

Intro new alleles disturbs nat selec