Name _____ Date _____

Biodiversity and Human Impact Unit Review: Keystone Species, Invasive Species, Habitat Loss and DDT

Directions: Answer the questions on biodiversity and human impact. The last group of questions uses a table of DDT measurements from a coastal food chain.

1. Biologists describe biodiversity at three levels. Which list names them?

A. The variety of species, the number of individuals in each species, and the size of the habitat

B. Genetic diversity within species, the variety of species, and the variety of ecosystems

C. Genetic diversity within species, the number of predators, and the number of producers

D. The variety of ecosystems, the total mass of all organisms, and the number of food chains

2. A new disease reaches two wheat fields that grow under similar conditions. One field is planted with a single variety whose plants are nearly identical genetically, and that variety is susceptible to the disease. The other is planted with a mix of varieties that carry different alleles for disease resistance. Which field is more likely to have plants that survive?

A. Both fields equally, since genetic variety has no effect on how plants respond to disease

B. The field with one variety, since plants that are genetically alike always resist a disease together

C. The field with a mix of varieties, since some of its plants are more likely to carry alleles that resist the disease

D. Neither field, since a new disease always kills every plant of a species that it reaches

3. Which two of these are benefits people get from biodiversity?

☐ A. Many crops are pollinated by wild bees and other insects.

☐ B. Invasive species spread faster where many native species live.

☐ C. Medicines have been developed from chemicals first found in wild plants.

☐ D. Fish-eating birds collect DDT from the fish that they eat.

☐ E. Kelp forests disappear when sea urchins are left unchecked.

4. In a long-term study of grassland plots in Minnesota, plots with more plant species lost less of their plant growth during a severe drought and recovered more fully afterward than plots with few species. Which conclusion do these results support?

A. In these grasslands, plots with more species kept their plant growth better through the drought.

B. The results prove that any ecosystem collapses as soon as it loses even a single species.

C. The number of plant species had no connection with how the plots responded to the drought.

D. Plots with fewer plant species always produce more plant growth than plots with many species do.

5. What makes a species a keystone species?

A. It is the first species to arrive on bare ground after a disturbance such as a fire.

B. It is always the most common species, so it outnumbers every other one in its community.

C. It is the largest predator found anywhere in its ecosystem.

D. Its effect on its community is far larger than its numbers alone would suggest.

6. Along parts of the North Pacific coast, sea otters eat sea urchins, and sea urchins graze on kelp. Studies compared coasts where otters were present with coasts where otters were absent. Which pattern did they find where otters were absent?

A. Urchins died out, since otters were no longer there to protect them.

B. Kelp grew thicker than on other coasts, since no otters swam through it.

C. Urchins became far more common and grazed away much of the kelp.

D. Kelp and urchins stayed the same, since otters do not eat kelp.

7. Why can an invasive species often spread quickly after it reaches a new place?

A. It cannot reproduce in its new home, so it keeps spreading in search of mates.

B. It is always larger and stronger than every native species in its new home.

C. It often leaves behind the predators, diseases and competitors that limited it at home.

D. It evolves on purpose to fit its new home within a single generation of arriving.

8. The brown tree snake was carried to the island of Guam by accident, most likely in cargo, soon after World War II. Guam's forest birds had evolved without snakes like it. Over the following decades, most of the island's native forest bird species disappeared. Which explanation fits these events best?

A. The snake changed the island's climate, so the birds could no longer find their usual food.

B. The birds had few defenses against this new predator, and the snakes had plenty of prey and few natural enemies.

C. The birds all chose to leave the island and fly elsewhere once the snakes had arrived.

D. The birds were outcompeted for seeds, since the snake eats the same food that they do.

9. A large forest is split into many small patches separated by roads and fields. Apart from the loss of forest area, how can splitting the forest harm forest animals?

A. Small patches always hold more species than one large forest, since they have more edges.

B. Splitting the forest matters only for plants, since every kind of animal can cross roads and fields.

C. Each small patch quickly grows back into one large, unbroken forest on its own.

D. Small, separated populations are more likely to die out, and animals may not reach other patches.

10. Fill in the blanks about how DDT builds up in food chains, using the word bank.

Word bank
fat • trophic level • biomagnification • succession • bones • photosynthesis

DDT breaks down very slowly, and it builds up in an animal's _____ because the body gets rid of it only slowly. Because each predator eats many prey over its life, DDT tends to become more concentrated at each higher _____, a pattern called _____.

DDT in a Coastal Marsh

In a study, scientists measured DDT in the water of a coastal marsh and in organisms at each level of one of its food chains, years after DDT had been used in the area. Each value is the mean of 5 samples.

Mean DDT concentration at each level of a coastal marsh food chain, in parts per million (ppm), from 5 samples at each level

Part of the food chain	Mean DDT concentration (ppm)
Marsh water	0.00004
Plankton (tiny drifting organisms)	0.03
Small fish that eat plankton	0.4
Large fish that eat small fish	2.2
Fish-eating birds	18

11. About how many times higher was the mean DDT concentration in the fish-eating birds than in the small fish?

A. About 18 times B. About 450 times C. About 8 times D. About 45 times

12. Which statement do these data support?

A. Mean DDT concentration rose at each step, from the water up to the fish-eating birds.

B. Mean DDT concentration was about the same at every level, since all share the same water.

C. The plankton had the highest DDT concentration, since they take it straight from the water.

D. Each kind of organism made DDT inside its own body, which is why the values differ.

13. Based on how DDT moves through food chains, which explanation fits the high concentration in the fish-eating birds best?

A. The birds drink far more marsh water than the fish do, so they take in more DDT.

B. Sunlight on the birds' feathers turns other chemicals in their bodies into DDT.

C. Birds are the youngest organisms in the marsh, and young bodies collect the most DDT.

D. Each bird eats many fish over its life and stores much of their DDT in its own fat.

14. In the 1960s, fish-eating birds such as ospreys and brown pelicans with high levels of DDT and its breakdown products often laid eggs with thin shells that broke during incubation. What effect would this most likely have on those bird populations?

A. Fewer chicks would hatch, so the populations could decline even if most adults survived.

B. More chicks would hatch, since thin shells are easier for the chicks to break out of.

C. The adults would grow thicker shells on later eggs, because their chicks needed them.

D. The populations would stay the same, since adult birds are not harmed by thin eggshells.