

Sonoran Desert / Ecology Test

I. Visuals (16 pts)

- 1a. _____ What type of flight adaptation is this?
- b. _____ Name the bird pictured.
2. _____ What resource is this species adapted to conserve?
- 3a. _____ What type of flight adaptation does this species have?
- b. _____ How do its flight feathers differ from other birds?
4. _____ What adaptation is shown by this animal?
- 5a. _____ List 2 ways these animals' niches reduce overlap.
- b. _____
6. _____ What flight pattern does this aircraft mimic?
- 7a. _____ Name the biome where this plant lives.
- b. _____ Name the group this plant belongs to.
8. _____ Identify the role these species play within their communities.
9. _____ What aspect of biomimicry was discussed with this feather?
10. _____ Name a limiting factor that was the cause of this bird's decline.
- 11a. _____ Name the organism the arrow is pointed at.
- b. _____ Name the relationship it has with the Saguaro.

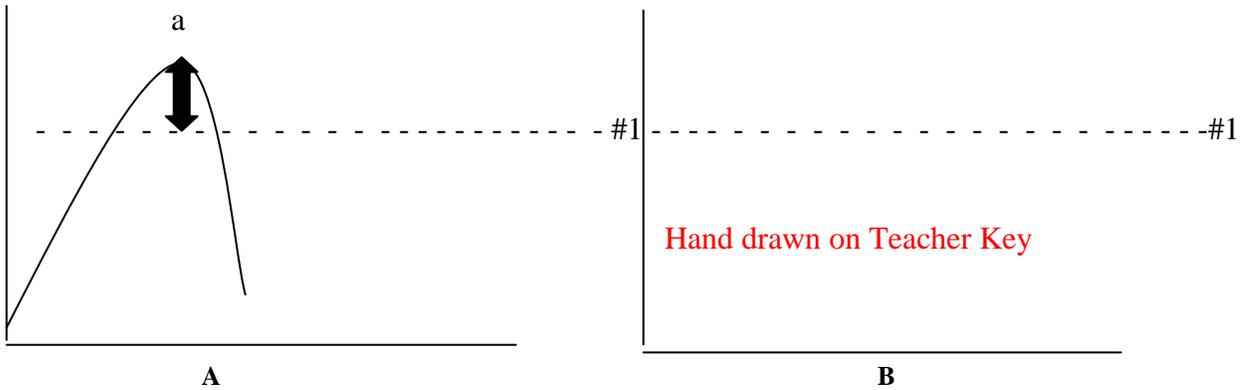
II. Multiple Choice (1 point each)

- ___ 1. Which is true about carrying capacity?
- a. Carrying capacity can raise or lower depending on limiting factor availability
 - b. Carrying capacity is fixed and never changes
 - c. Carrying capacity determines population density
 - d. Carrying capacity determines the amount of limiting factor
 - e. a & c
 - f. a & d
 - g. b & c
 - h. b & d
- ___ 2. Photosynthesizing organisms are referred to as:
- a. consumers
 - b. heterotrophs
 - c. omnivores
 - d. autotrophs
- ___ 3. A generalist's niche is ___ than a specialist's and makes it ___ likely to be threatened.
- a. wider, more
 - b. wider, less
 - c. narrower, more
 - d. narrower, less

- ___4. Which is not an abiotic part of the environment?
a. decomposer b. sunlight c. water d. soil
- ___5. The greatest number of individuals that a space can support indefinitely without degrading the environment is called:
a. carrying capacity b. limiting factor c. density d. homeostasis
- ___6. What two factors cause population density to **decrease**?
a. emigration and mortality c. emigration and natality
b. immigration and mortality d. immigration and natality
- ___7. Which biome has a wet, mild winter and a hot, dry summer?
a. desert b. chaparral c. grasslands d. taiga
- ___8. What conclusion can be drawn from the observation that both downy and pileated woodpeckers are observed at Radnor Lake?
a. each species niche is identical to the other
b. each species niche is 100% different to the other
c. slight niche overlap is expected
d. no conclusion can be drawn
- ___9. The feathers of a bird's wing form a continuous surface due to the interlocking _____:
a. vane and barbs b. vane and barbules c. shaft and vane d. barb and barbules
- ___10. The biome with the richest, most fertile soil is the:
a. rainforest b. grasslands c. deciduous forest d. chaparral
- ___11. Nicotine is a chemical extract produced by _____ to protect against _____.
a. tobacco, herbivores c. milkweed plants, monarch butterflies
b. cocoa beans, carnivores d. caterpillars, predation
- ___12. As one moves east away from the Rocky Mountains, rainfall ____ and grasses are ____
a. increases, taller c. decreases, taller
b. increases, shorter d. decreases, shorter
- ___13. Which is not a part of the biosphere?
a. oxygenated atmosphere b. earth's rock mantle c. species d. soil e. water
- ___14. The stability of a community generally increases with a:
a. greater diversity of organisms and more links in the food web
b. greater diversity of organisms and fewer links in the food web
c. lower diversity of organisms and fewer links in the food web
d. lower diversity of organisms and more links in the food web
- ___15. Which best represents carrying capacity for an environment?
a. sum of its limiting factors c. biotic components
b. abiotic components d. population density
- ___16. Which does not restrict population growth?
a. predators b. disease c. natality rate d. competition
- ___17. How does carrying capacity differ between coyotes and rabbits?
a. both exist at the same density c. coyotes always have a higher density
b. rabbits always have a higher density d. both respond to the same limiting factors
- ___18. Flight occurs as _____ pressure above a bird's wing and _____ pressure beneath causes lift :
a. high, low c. high, high
b. low, high d. low, low
- ___19. A limiting factor can be:
a. abiotic c. positive e. all of the above
b. biotic d. negative
- ___20. Which is not an example of biomimicry and its study?
a. camouflaged arctic fox c. wetland based water purification
b. termite mound ventilation d. structural color of butterfly wings

III. PROBLEMS, GRAPHS AND TABLES

1. Growth Rate Curves (8 pts)



IDENTIFY CURVES: A. _____ B. _____

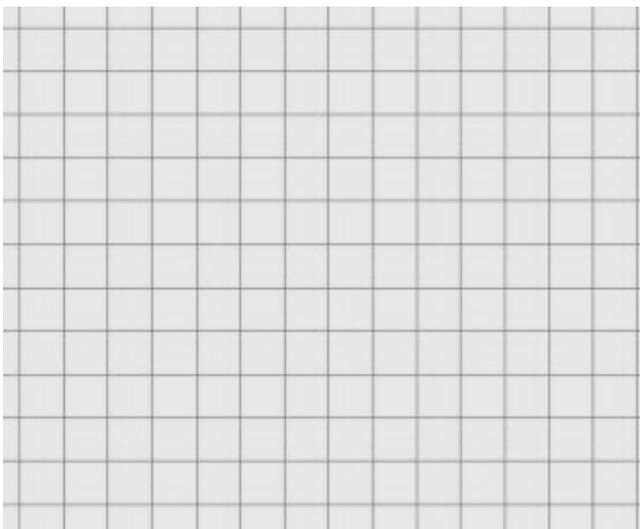
What does #1 represent on each graph? _____

What does “a” represent in graph A? _____

Explain in 1 sentence why the line drops quickly in Growth Rate Curve A

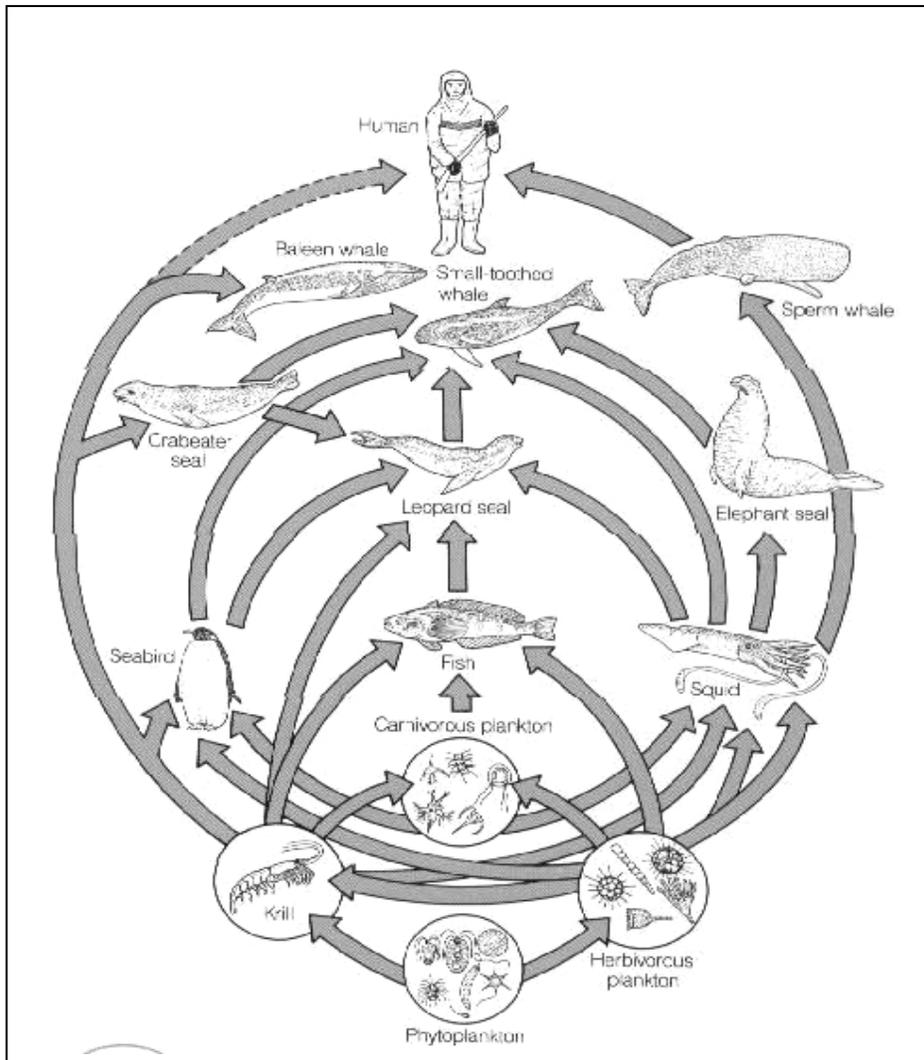
List 2 examples of species that follow the pattern shown in Graph A.

2. **Graph** the following data, **label** each axis with all necessary information. Next, **draw** a line on the graph to indicate where carrying capacity is. (5 pts)



Date	Deer Density
1983	14
1984	19
1985	26
1986	34
1987	38
1988	46
1989	44
1990	45
1991	46
1992	47
1993	45

3.



a. Diagram a 4 species food chain from the above food web.

b. List all of the food resources shown for the small toothed whale.

4. Compare the two graphs below. **CIRCLE** which graph represents two species successful in occupying the same habitat and **explain why** they are successful compared to the unsuccessful graph. (2-3 sentences) (4 pts)

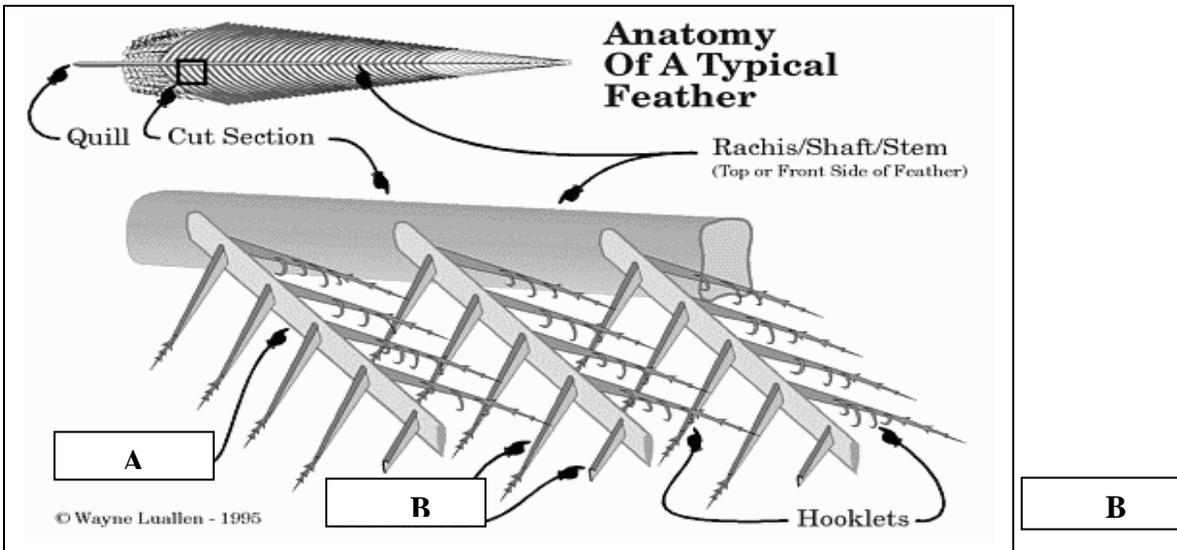


A



B

Hand drawn on Teacher Key

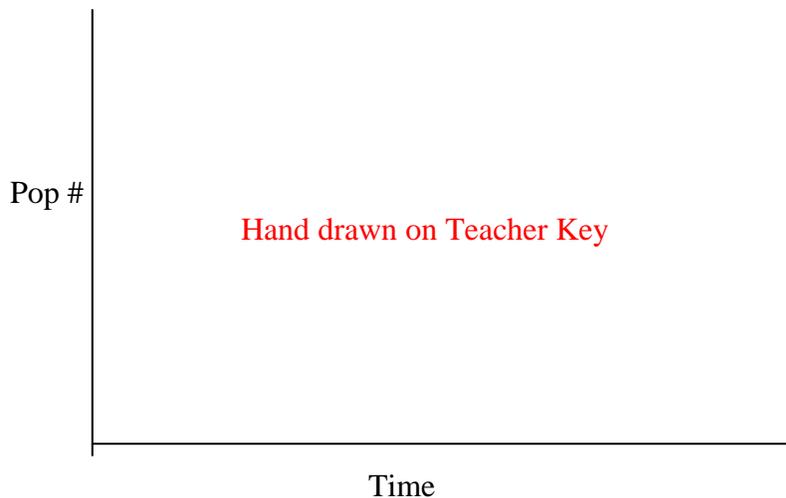


(4pts)

5. Identify A: _____ B: _____

Explain what their function is to the wing of a bird.

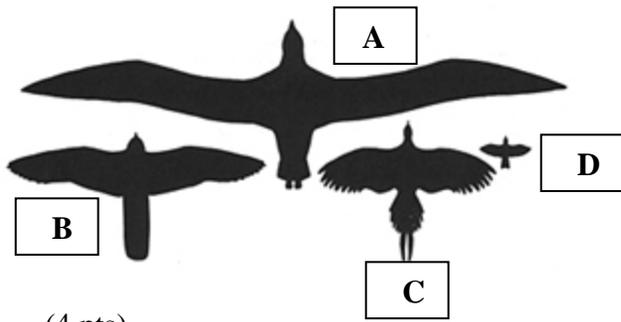
6. Look at this typical predator-prey cycle. Label which is the predator curve and which is the prey curve. (7 pts)



LIST 3 "rules" that apply to a predator-prey relationship:

a. _____ c. _____

b. _____



(4 pts)

7. Identify the silhouette that shows a bird with high flight speeds: _____

Identify the silhouette that shows a bird with a gliding flight pattern: _____

8. List 3 adaptations plants have evolved to defend themselves against herbivores. (6 pts)

a. _____ b. _____

c. _____

9. List 3 vital functions that wetlands serve that would economically benefit humans and demonstrates the need to protect these areas. (6 pts)

10. List the 3 biomes located at mid-latitudes.(3 pts)

11. List 3 adaptations that aeronautical engineers have biomimicked AND identify the bird with this adaptive trait. (6 pts)

Adaptation

Bird

_____	_____
_____	_____
_____	_____

Short answer: Responses should be 3 – 5 sentences in length. (5 pts)

1. Explain the benefits of studying and understanding aspects of biomimicry. Provide 2 examples from the “12 Patterns of Biomimicry”.

You may choose to only offer one of the two short answer responses given here.

2. Explain the relationships that the white-winged dove has to the following species and how the dove affects the population densities of the other species listed: (7 pts)

Harris antelope ground squirrel

Harris Hawk

Saguaro

