Lab 15, Biol-1, C. Briggs, revised Spring 2018
Portions adapted from T. Flisik, Mt. SAC

Names: _____
Lab day of week: _____

**Objectives**

- Review lab material before our final exam in lab.
- Become more familiar with ecological concepts like food webs, trophic interactions, and interdependence.
- Take some time to explore of the Wildlife Sanctuary.

**Instructions**

Please complete this lab handout. Labeled drawings are always helpful.

1. Find a body of water. Excess nutrients like _____ and _____ could lead to a bloom of algae. Decomposition of this algae could lead to low levels of oxygen in the water, sometimes called a _____ zone.

2. Do you see any evidence of excess nutrients in this body of water?

3. Where might excess nutrients come from, outside the Wildlife Sanctuary?

4. How is the plant community at the water's edge different from the plants further away?

5. Is the water a biotic factor, or an abiotic factor?

6. Feel the mud, and feel the dry dirt.
   Compare their textures.
   Compare their smells.
   Compare their tastes. (Nope. Just kidding!)

7. Listen quietly for a period of three minutes. List everything you hear. What fraction of these are noises that people are responsible for?

8. Find evidence of a plant experiencing herbivory. Describe the evidence here.

9. Find evidence of an animal eating another animal. Describe the evidence here.

10. Find evidence that plants help store carbon in the soil. Describe the evidence here.

11. Find a gymnosperm. How do you know it is a gymnosperm?

12. Find an angiosperm. How do you know it is an angiosperm?

13. Find two different plants whose leaves have interesting smells. It can help to rub their leaf between your fingers. Describe both smells here.

14. Find some ants. Where are they are going?

15. Find a bird, and describe what it is doing.

**Mystery organism #1:**

16. I live in burrows made by other animals because my front legs are not adapted for any serious digging. My hind legs, however, are long and strong, and allow me to run quickly. I have a small white tail, which is where I get one of my common names. I rarely drink water because I get most of my water from the vegetation that I eat. I also eat my own feces to extract more nutrients from the plant material -- a behavior called coprophagy.

    What animal am I? _____. If you're sneaky you can get a picture of me!

17. Does the orientation of my eyes suggest that I am a (A) primary, or (B) secondary consumer? _____.

18. The similarity between my forelimb bones and your forelimb bones is an example of _____.
    (A) co-evolution (B) analogy (C) homology (D) macroevolution

19. In my forelimb, in what order would these bones likely be connected, starting at my pectoral girdle?

    Phalanges, humerus, ulna, radius, carpels, metacarpels.

20. In my hindlimb, in what order would these bones likely be connected, starting at my pelvic girdle?

    Tibia, metatarsals, tarsals, fibula, phalanges, femur, patella.

21. Like all mammals, I have a four-chambered heart. Within my body, the oxygenated blood moves through the pulmonary vein into the _____ of my heart.
    (A) right atrium (B) right ventricle (C) left atrium (D) superior vena cava

22. Why hasn't this population of herbivores eaten all of the plants in this area? In other words, what ecological processes or phenomena are preventing them from eating all the plants?

**Mystery organism #2:**

23. I do pushups to let other males and the females know that this is my territory. I typically hibernate during the cold winter months, and can often be seen basking in the sun during warm summer months, which helps stimulate my metabolism. My blue belly may make me more visible to predators, but the females love it.

    What animal am I? _____. Try getting a photo of me, preferably when I'm doing some pushups.

24. Which of the following best describes my strategy for thermoregulation? _____.
    (A) Ectothermic homeotherm
    (B) Endothermic homeotherm
    (C) Endothermic poikilotherm
    (D) Ectothermic poikilotherm

25. The presence of my blue belly is evidence for which of the following? _____.
    (A) Natural selection (B) Artificial selection (C) Sexual selection (D) Macroevolution

**Mystery organism #3:**

26. My leaves and bark contain tannins, which can inhibit the growth of other plants growing around me. On the bottom of my serrated, cupped leaves I have small hairs called trichomes. Many different animal species feed on my seeds. The western scrub jay (not a blue jay) will stash my seeds by burying them throughout the area. During winter months, the birds can remember where they stashed most (but not all) of my seeds.

    What am I? _____. Bring back one of my seeds.

27. How might this relationship be beneficial to the fitness of both myself and the scrub jay?

**General:**

28. Find an organism that has an r-selected life history strategy. (We also called these "opportunists.") Describe it here.

29. List two characteristics that define an organism with an r-selected life history strategy.

30. Draw in the survivorship curves for r-selected (opportunist) and K-selected (equilibrial) organisms in the space below. Be sure to label your axes.

31. A characteristic of a monocot is long parallel veins that run the length of the leaf. Find a plant that has this characteristic and describe it here.

32. Black mustard (*Brassica nigra*) is a highly invasive plant that can colonize an entire area, especially after being disturbed by a fire. These plants have lots of small yellow flowers, which can develop into lots of little seed pods when fertilized. Black mustard plants emit allelochemicals from their roots, which inhibit the growth of other plant species nearby. The fast growth of mustard plants, along with their allelochemicals, allows mustards to dominate disturbed habitats. The mustard plants then form monocultures, or areas dominated by a single species. Find a black mustard plant, and describe what it looks like.

33. Predict what would happen to the biodiversity of an area if black mustard was introduced after a fire.

34. Pick any plant or animal species and select a specific characteristic of that organism. Make a prediction about how that characteristic is an adaptation for increased survival or fitness. Describe your prediction below. (For example, the green heron has long, featherless legs that allow it to wade through shallow water in pursuit of fish. It also has a long, sharp bill used to snatch up small fish along the shoreline.)

35. Draw a food web for the Wildlife Sanctuary. Include at least five different species and three different trophic levels.

36. Decomposition is an important part of the nutrient cycle within an ecosystem. Find and describe an example of decomposition.

37. Return with a piece of trash that you find in the Sanctuary (not something you brought in).