CHAPARRAL LOCAL FOOD WEB ACTIVITY

Essential Knowledge: 2A1f: Changes in the free energy availability can result in disruptions to an ecosystem.

Part One Directions: Students will construct a food web of their local chaparral environment. The food web needs to include the organisms listed below. The details of the assignments are as follows:

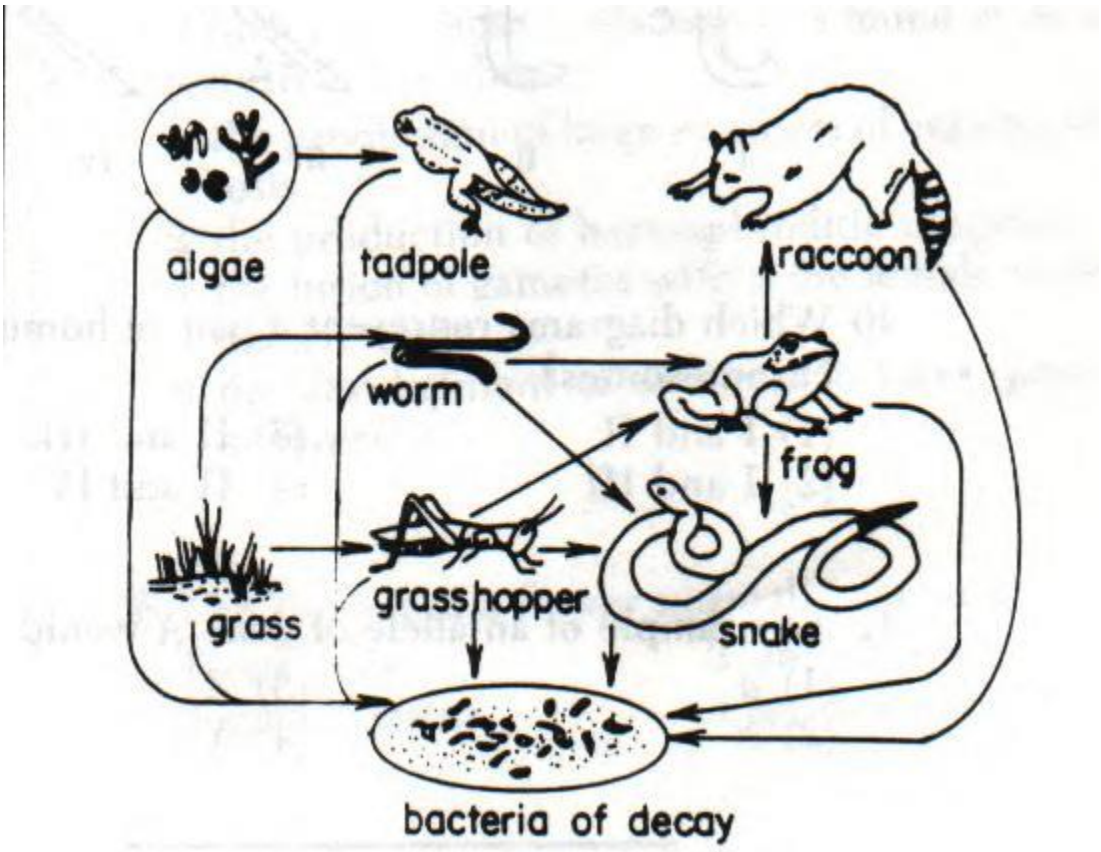
1. List the organisms in the correct sequence in the food web.
2. Identify the organism as a producer (P), consumer (C), or decomposer (D).
3. Draw the arrows so that they show where the energy is going to.

Organisms to Include in the Food Web:

- Coastal live oak tree	-coyote	-red tailed hawk
- Blue whale	-krill (zooplankton)	-gray squirrel
- diatoms (phytoplankton)	-raccoon	-western rattlesnake
- squid	-bacteria	-western fence lizard

If you are not familiar with these organisms, use Wikipedia for pictures and diets. Please remember that arrows show where the energy is going to.

Example of a Food Web-Temperate Deciduous Forest



Producers:	**Consumers:**	**Decomposers:**
Algae	Tadpole	Bacteria
Grass	Worm	
	Grasshopper	
	Snake	
	Raccoon	
	Frog	

ANTARCTIC FOOD CHAIN ACTIVITY

Part Two: 2nd Law of Thermodynamics Problems and Analysis

Directions: Answer the questions below using complete sentences. Do not forget to place your units with your answers! And, show your work. **Hint**: Remember the Rule of 10! Organisms can only efficiently use 10 % of the energy they received from an organism at a lower trophic level. The other 90% is wasted as heat energy (entropy).

1) A leopard seal ate a squid. The squid contained 90,000 Calories of energy. How much did the leopard seal obtain?

2) An orca ate the leopard seal. The leopard seal contained 50,000 Calories of energy. How much did the orca obtain?

3) A blue whale ate 2 pounds of krill. Each pound of krill contained 300,000 Calories of energy. How much did the blue whale obtain?

4) A deadly pesticide toxin entered in the ocean via rainwater runoff. This toxin killed off many of the diatoms (phytoplankton) of the Antarctic area. What will occur to the populations of each of the trophic levels in this food web? Explain thoroughly and do not forget the decomposers.

5) In a plot to control Springfield, Mr. Burns designed a contraption that blocked out the sunlight entering Springfield. Thus, the city would have to rely on his nuclear power. If the amount of sunlight reaching Springfield is reduced, what would occur to the other trophic levels in the area? Again, explain the effects of each trophic level thoroughly.