Unit 12- Ecosystems

*A POPULATION is two or more organisms of the same kind living in the same place.

*A COMMUNITY is two or more populations living in the same place.

*An ECOSYSTEM is two or more communities living in the same place.

*Ecosystems contain both living and non-living elements. The non-living elements include water, nutrients, and oxygen, all of which are essential to life.

*Ecosystems are divided into five TROPHIC LEVELS:

1. PRODUCERS, which are green plants, utilize PHOTOSYNTHESIS to capture sunlight and convert sun energy into chemical energy.
2. FIRST ORDER CONSUMERS are HERBIVORES that eat the producers.
3. SECOND ORDER CONSUMERS are CARNIVORES that eat the first order consumers.
4. THIRD ORDER CONSUMERS are carnivores that eat the second order consumers.
5. DECOMPOSERS are BACTERIA and FUNGI that recycle nutrients by breaking down dead organisms.

*The producers and decomposers are the only trophic levels that are essential to the operation of the ecosystem

***See Figure 15 for pyramids of the relationships between numbers, biomass, and energy between trophic levels.**

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*In ecosystems, matter is continuously re-cycled.

*In ecosystems, whether numbers, biomass, or energy, most is concentrated in the lower trophic levels. Only 10% of the numbers, biomass, or energy is transferred from one trophic level to the next due to the SECOND LAW OR THERMODYNAMICS.

*The shape of the pyramids is based on the SECOND LAW OF THERMODYNAMICS. This law says every time energy is converted from one form to another, most energy, approximately 90%, is lost.

*If toxins are present in an ecosystem they end up concentrating in the higher trophic levels, this is called BIOLOGICAL MAGNIFICATION. **See Figure 16 for an example of biological magnification in a lake contaminated with the toxic insecticide DDT.**

*A FOOD CHAIN is a linear progression that portrays a simple ecosystem with few animals. This type of feeding is normally present in an unstable environment with very harsh climates with few organisms, for example the arctic.

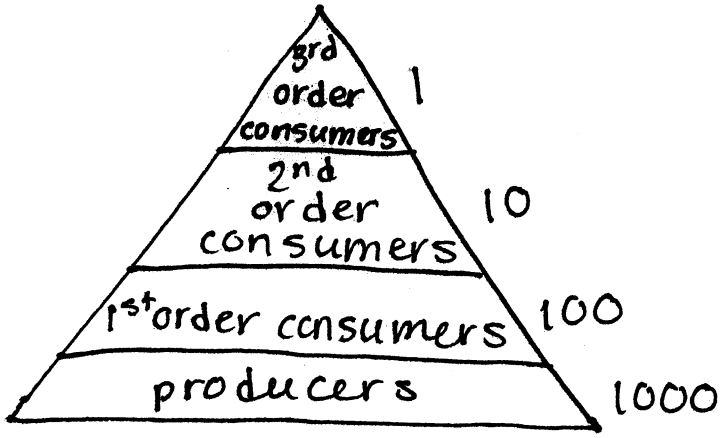
*A FOOD WEB portrays a complex ecosystem that is normally present in mild climates, Auburn for example, where there are many different organisms. This type of feeding is present in a stable environment.
See Figure 17 for an illustration of a food chain and food web.

Final Lecture Exam:
-About 25 questions from units 1-10 (objectives 1&2)
-About 25 questions from united 10 (objectives 3&4), 11, 12, and 16

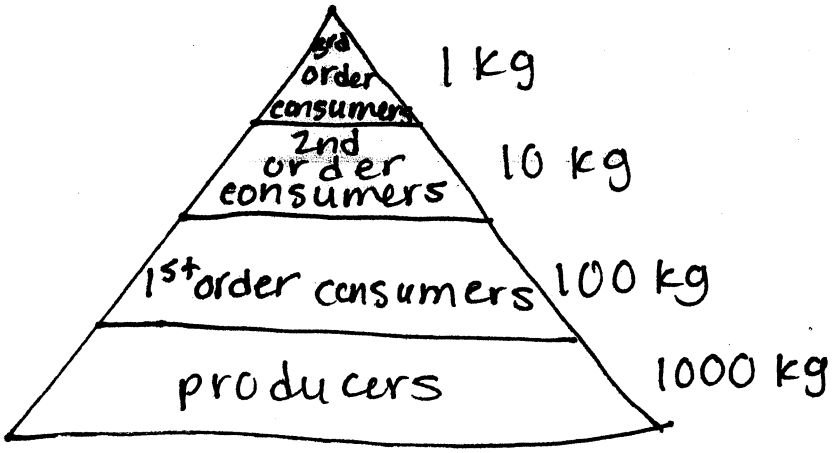
Final Lab Exam:
-15 questions from labs 8,9, and 10

Figure 15

Pyramid of Numbers



Pyramid of Biomass



Pyramid of Energy

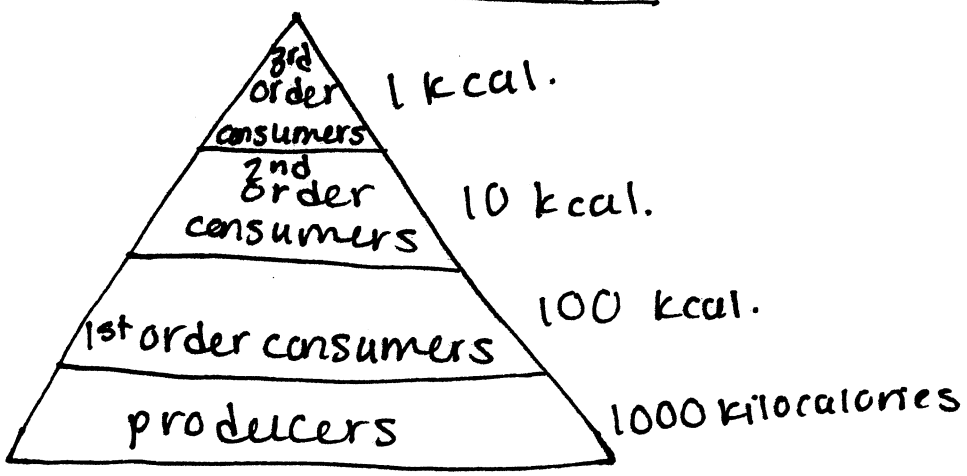
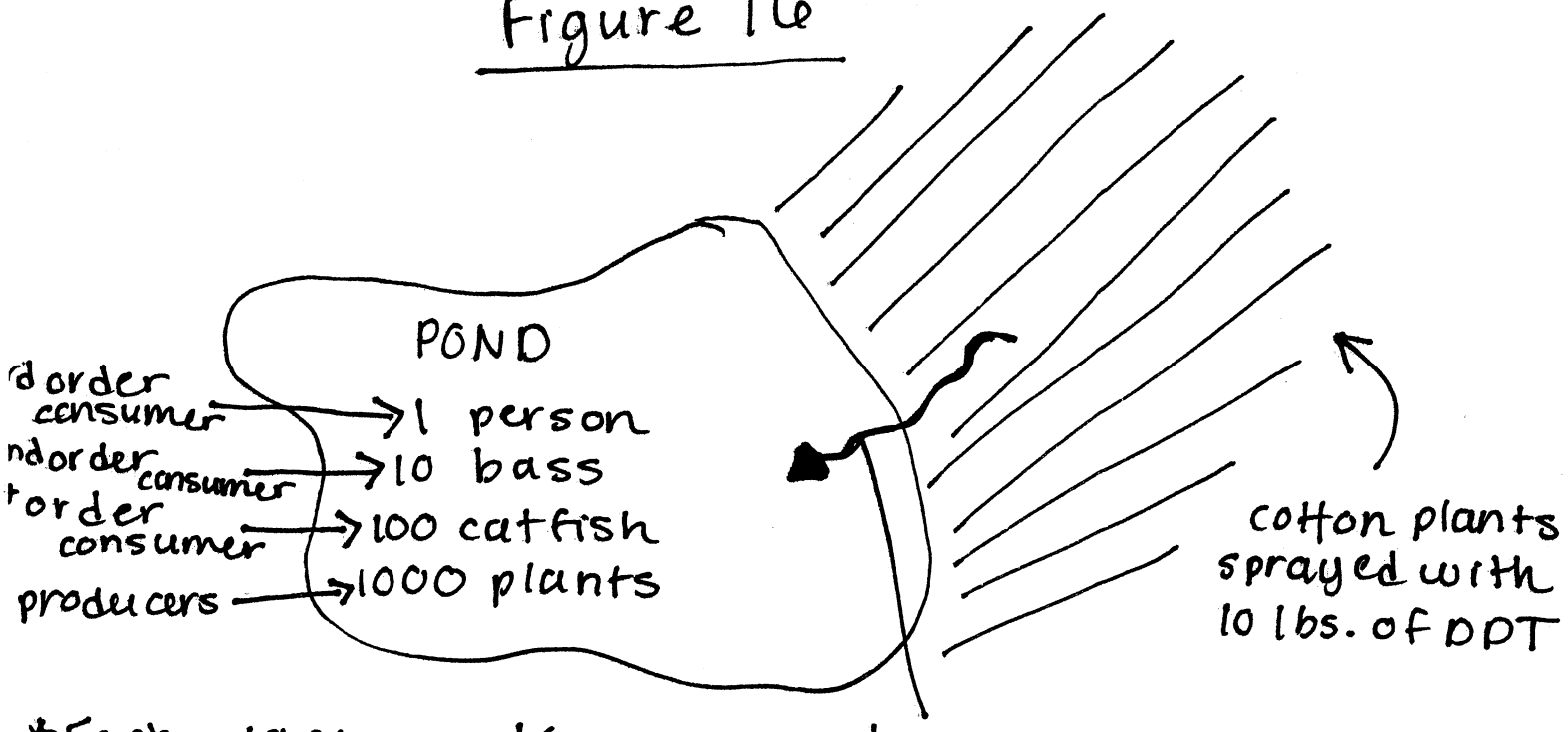


Figure 16



*Each plant gets 1/1000 lb. DDT 1 pound washes into pond
*Each catfish gets 1/100 lb. DDT from eating plants.
*Each bass gets 1/100 lb. DDT from eating the catfish.
*The person gets 1 lb. DDT from consuming the basss (2nd order consumer)

Figure 17