

Name _____
Date _____

Class Period _____

ELK GAME INTRODUCTION

1) In a food chain and food web, there are primary producers, primary consumers, secondary consumers, tertiary consumers etc. What do each of those terms mean? Give an example of each.

Primary Producer:

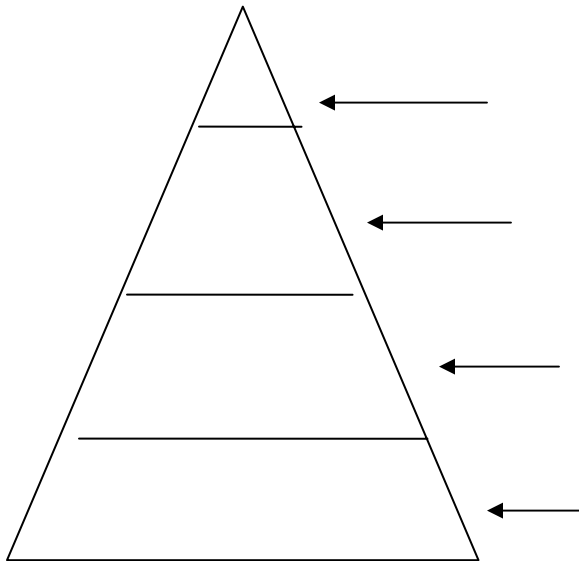
Primary Consumer

Secondary Consumer

Tertiary Consumer

Decomposer:

2) The diagram below is a pyramid of energy. Label each of the trophic levels in the pyramid.



3) What % of the energy from one trophic level is transferred to the next trophic level up? Why is so much energy lost?

4) What is a population?

5) What is a community?

6) Define carrying capacity (K).

7) What limits carrying capacity.

8) Draw a food web for the players in our game (plants, elk, cows, wolves, hunters).

9) What is chronic wasting disease?

10) If chronic wasting disease is introduced into a population, how will it affect the elk population size? How will the change in elk population size affect the other populations in the food chain (plants, cows, wolves, hunters)?

Rules for Elk

Eating - Elk must visit each food patch only once per round and take 200 plant units (1 bite) from each patch.

Reproduction - If a male elk has at least 200 units of plant energy and wants to reproduce, he must find a receptive female elk (to be receptive she must have at least 600 units of plant energy). Together they must go to the holding pen and pay 800 units of energy for a baby elk (600 units from the mom and 200 from the dad). In real life, as in this game, the mother contributes more energy to obtaining the baby because she is the one that must expend the most energy by carrying and nurturing the baby. The baby elk must stay at its mother's side for the rest of the round because babies have to learn from their mothers how to forage for food and avoid predators.

Predation – A hunter can kill an elk by hitting it with a bullet (Nerf ball) on the shin. A pack of wolves can kill an elk if all members of the pack touch the elk on the shoulder. If an elk dies, it must give half of its energy to the hunter or wolf pack and return half of its energy to the buckets of food. This is because predators rarely eat all of an animal. Bones and other indigestible parts are decomposed and contribute nutrients to plant production. After giving up its energy, the elk must go to the holding pen as a “dead” animal waiting to be reborn. A male elk can have as many babies as he can afford per round. A female elk can have only one baby per round.

Disease – If an elk eats a plant unit that has “CWD” written on it, it must move around by hopping on one leg until it is killed by a predator or until it dies of the disease after 2 complete rounds, whichever comes first. This signifies that the animal is not healthy. Individuals with CWD cannot reproduce.

Rules for Cows

Eating – Cows must visit each food patch only once and take 200 units (1 bite) from each patch.

Reproduction – Cows cannot reproduce in this population because they are all female.

Predation – A wolf pack can kill a cow if all members of the pack touch the cow on the shoulder.

Disease – CWD does not affect cows and cannot make them unhealthy.

Rules for Hunters

Eating – Hunters can kill 2 elk per round by hitting them in the shin with their Nerf ball “bullets”. When the hunter kills an elk, the elk must give the hunter half of its energy units and put half of its energy units back in the grass buckets. This is because the hunters won’t take all of the elk parts, some of them (such as bones) will decompose and the nutrients will contribute to plant production.

Reproduction – Hunters do not reproduce in this system.

Predation – Hunters are defended by their bullets and cannot be killed.

Disease – Although humans may become sick from eating CWD infected elk, the symptoms are unclear and may not appear for decades. Therefore, in this game, hunters are not affected by disease.

Rules for Wolves

Eating – Wolves must hunt in a pack. A pack of wolves can kill up to 2 elk or cows during each round. In order to kill an animal, all members of the pack must touch it gently on the shoulder. If a wolf kills an elk, the elk must give it half of its energy units and put half of its energy units back in the grass buckets. This is because the wolves won’t eat all of the elk parts, some of them (such as bones) will decompose and the nutrients will contribute to plant production.

Reproduction – Wolves can reproduce. In order to obtain an offspring, a pack of wolves must exchange 800 units of energy for a baby in the holding pen. Wolf packs can only have up to 3 babies per round.

