

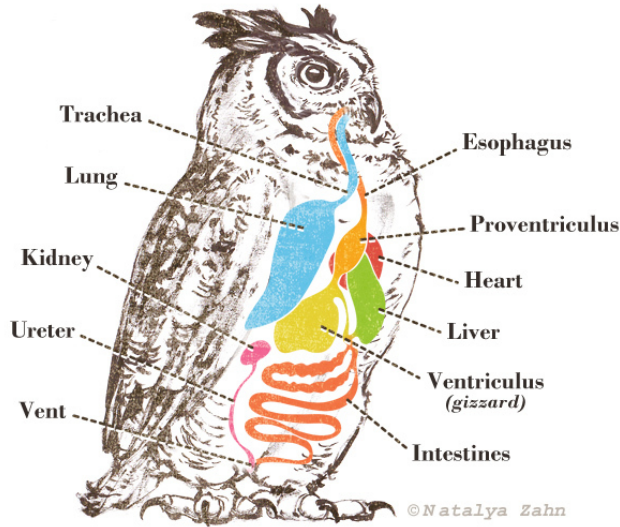
Name:

Date:

Owl Pellet Dissection

To determine the relationships in a food web, scientists examine feces, guano, or owl pellets to figure out what an animal is eating.

Owls store indigestible parts of their prey in their ventriculus (or gizzard) in matted pellets which are periodically spit out. By examining the pellets, scientists can determine an owl's prey.



In this activity, you will dissect an owl pellet, identify the prey species found within it, and determine how much the bird has eaten. Using this data, you will create an ecological pyramid.

Materials

- Owl pellet
- Metal probes
- Forceps
- Dissecting tray
- Paper plates
- Glue

Part One – OWL

Procedure

Dissection

1. Obtain one owl pellet for yourself and your partner(s). In the dissecting tray, carefully remove the tinfoil covering.
2. Using your forceps and wooden probes, break off a small piece of the pellet. REMEMBER: the bones you are looking for are small and easily broken
3. Carefully dissect the pellet and set aside any bones you find. Place the non-bone material from the pellet on a paper plate designated for trash.
4. Continue dissecting in small pieces until you are certain you have found all of the bone fragments/pieces.

Data

Identification

1. Compare the bones you find with the ones pictured on the bone charts, identify as many as possible.
 - a. Use a hand lens to get a good look at each bone.
2. Glue the bones to your piece of paper and make an educated guess as to how many creatures of each species were in the pellet.

REMEMBER:

- a. the lower jawbones of rodents will be found in two pieces
- b. If you find three jawbones, you can assume multiple rodents were eaten
- c. You may not find all of the bones of each individual

	House Mouse	Meadow Vole	Shrew	Brown Rat	Blackbird	Other
Pellet contents						

1. Share your data, which will be projected (or written on the white board) at the front of the room
2. Complete the data sheet (on the next page). Calculate each row across and find the totals for each column of the Data Sheet. Use 365 days to calculate the yearly amounts.

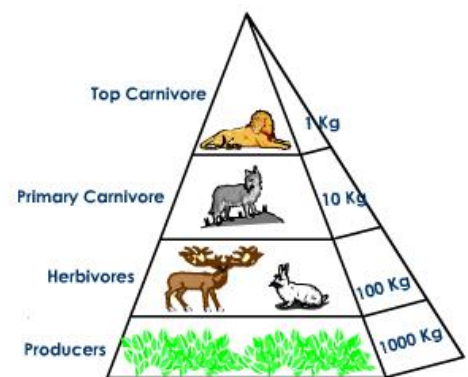
Prey Type	Mass	Number found in pellet	Average number eaten per year (1 pellet/day; 365 days)	Average number eaten over 2.5 yr lifespan	Average mass eaten per 24 hours (g)	Average mass eaten per year (365 days) (g)	Average mass eaten over a 2.5-year lifespan (g)
House Mouse	20 g						
Meadow Vole	40 g						
Shrew	5 g						
Brown Rat	240 g						
Blackbird	80 g						
Other							
	Total						

Analysis – Create a pyramid of numbers & a pyramid of biomass

Use the information obtained from your dissection of the owl pellet to determine the amount of mass and energy that was transferred from prey to the owl. The image to the right provides an example of a pyramid of biomass (biomass is the dry mass of organisms).

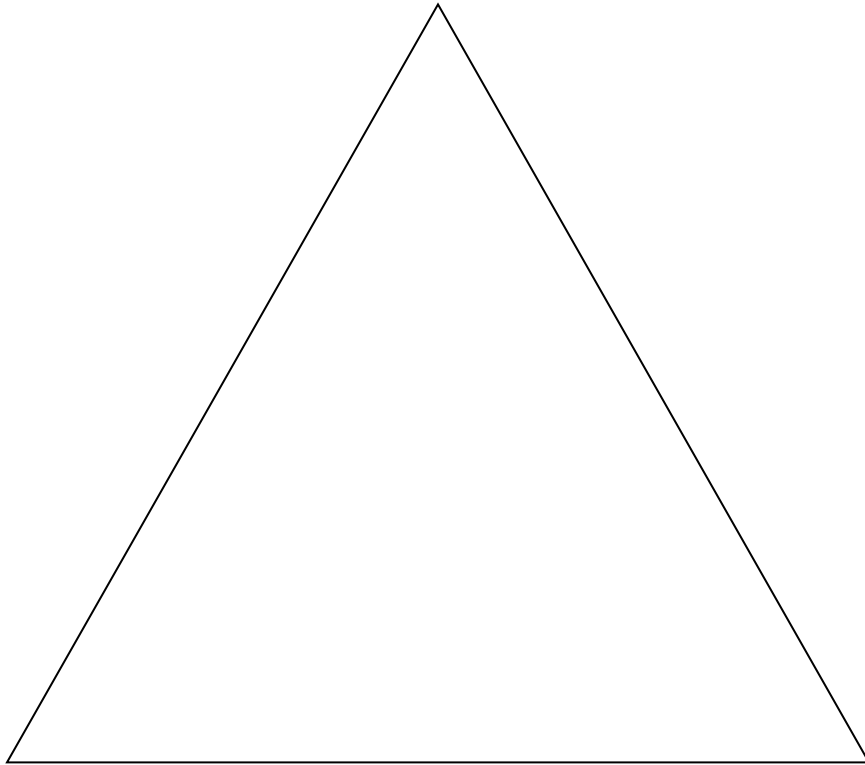
Pyramids

1. Create a **pyramid of numbers** with two trophic levels (primary consumers = prey and secondary consumers = owl). Use the total “Average number eaten over 2.5 year lifespan” column from your data sheet for the first trophic level of the pyramid. The second level is the population of owls (one).
2. Use the “Average mass eaten over a 2.5-year lifespan” column from your data sheet to create a **pyramid of biomass**. For the biomass of the secondary consumer, use the average weight of a single barn owl, 500 g.
3. Calculate the percent difference between the mass of primary consumers and secondary consumers; this will reflect how much mass was incorporated into the higher level. Assume that this number is also the net production of energy that is stored by the owls.

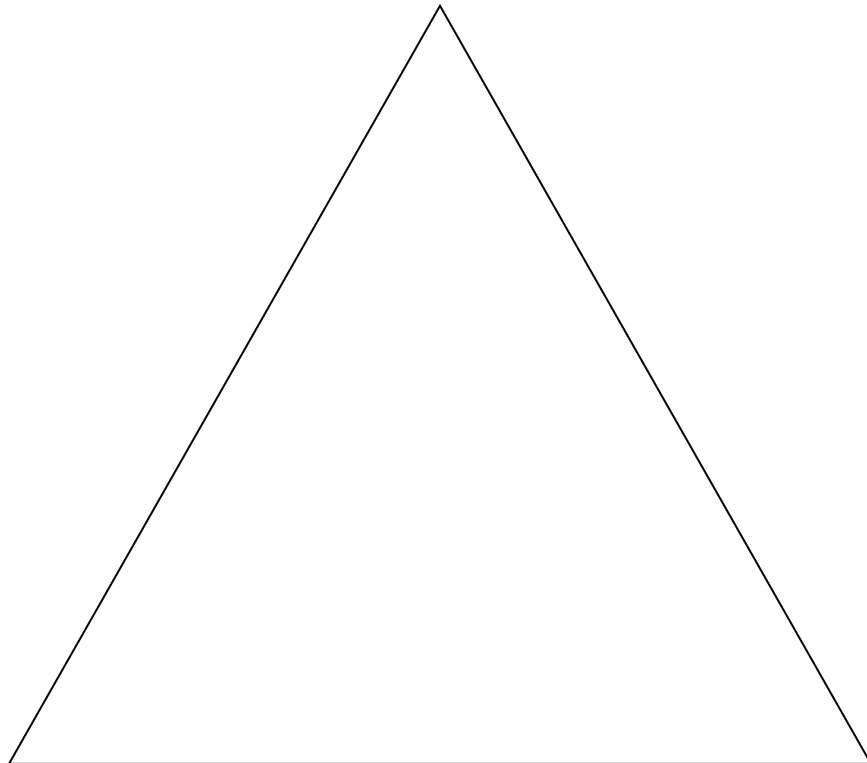


100(total mass of owls/average mass of prey eaten over a lifespan) = net production efficiency

Pyramid of Numbers



Pyramid of Biomass



Discussion Questions

1. Does the amount of energy transferred between owls and their prey match what you expected? Why or why not?
2. Chose two prey types. Explain why one prey choice may be better than the other, and discuss what costs may come about from eating one prey choice over another.
3. In terms of energy flow in an ecosystem, why is the amount of energy passed from one trophic level to the next so small? Since we know that energy cannot be destroyed, account for the loss of energy that occurs between the prey and the owl.
4. We know that about 50% of the energy in an organism is not digested by a consumer, and is simply passed through as waste. Is the energy stored in the waste lost to the ecosystem? Why or why not?