An illustration of a brown owl with large eyes and a small dog with floppy ears, both looking towards the viewer. The owl is positioned behind the word 'Owl' and the dog is behind the word 'Pellet'.

# Owl Pellet Essentials Guide

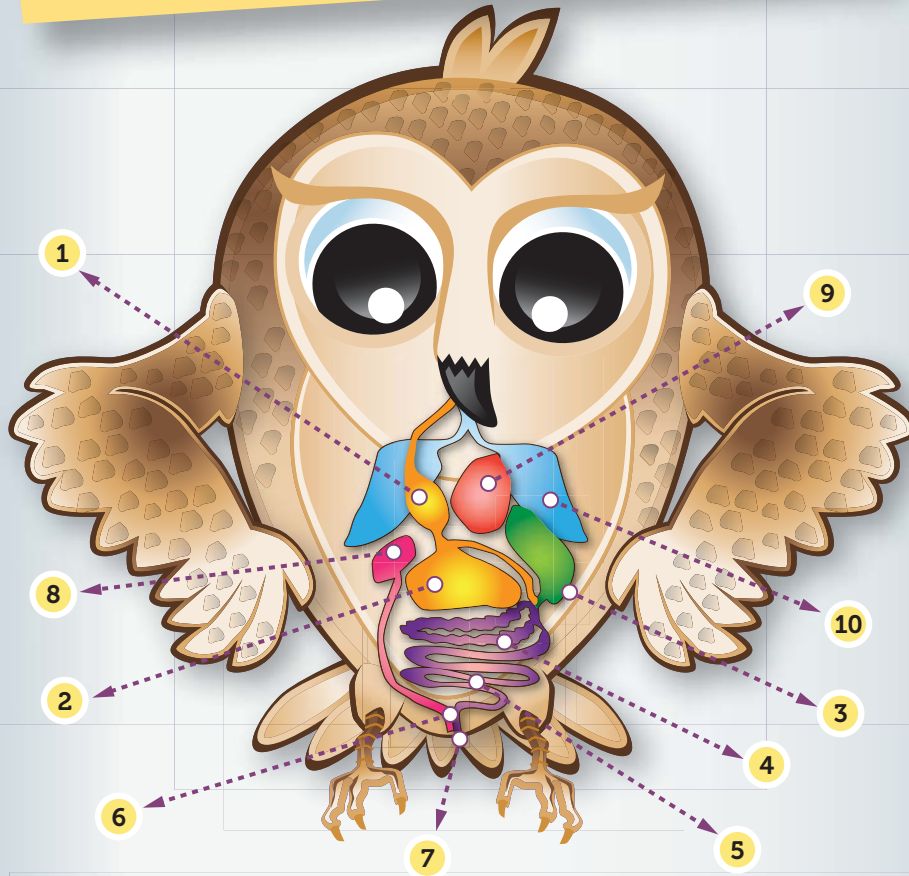
for Teachers  
and Students

Exploring  
Prey & Predator  
Relationships

A colorful illustration of a farm scene. In the foreground, a red barn with a black roof and white trim stands on a green lawn. A wooden fence runs across the lawn. In the background, a yellow field with several hay bales stretches towards a green hillside. A silver silo with a domed top is visible behind the barn. A large green tree stands to the right of the barn.

Owl Pellet Dissection Lab

## The Formation of Owl Pellets



- |                                |                     |                 |
|--------------------------------|---------------------|-----------------|
| <b>1</b> Proventriculus        | <b>4</b> Pancreas   | <b>8</b> Kidney |
| <b>2</b> Ventriculus (gizzard) | <b>5</b> Intestines | <b>9</b> Heart  |
| <b>3</b> Liver                 | <b>6</b> Cloaca     | <b>10</b> Lungs |
|                                | <b>7</b> Vent       |                 |



**Owl pellets** are a product of the unique digestion system of birds. Owls and other birds cannot chew their food as many animals do. They have to swallow their smaller prey whole and tear larger prey into pieces. An owl's food travels directly into their digestive system.

Bird stomachs consist of two parts. The first part is the glandular stomach or **1 proventriculus**, which produces enzymes, acids, and mucus that begin the process of digestion.

The second part is the muscular stomach, called the **2 ventriculus**, more commonly called a **gizzard**. There are no digestive glands in the gizzard. In birds of prey, the gizzard is useful as a filter, holding back insoluble items such as bones, fur, teeth and feathers.

The softer parts of the bird's diet are ground by muscular contractions, and allowed to pass through to the rest of the digestive system, which includes the **5 small and large intestine**. The **3 liver** and **4 pancreas** secrete digestive enzymes into the small intestine where the food is absorbed into body as energy.



At the end of the digestive tract (after the large intestine) is the **1 Cloaca** (klo-A-ka), a holding area for Uric acid, also known as Urea. Urea excretions are the white bird droppings we see on buildings and below perches. This form of excretion helps minimize water loss.

The cloaca opens to the outside by means of the **2 vent.**

Several hours after eating, the indigestible parts (fur, bones, teeth & feathers that are still in the gizzard) are formed into a pellet the same shape as the gizzard. This pellet travels up from the gizzard back to the proventriculus where it can remain up to ten hours before being gagged up.

Scientists have concluded that the pellet remains in the bird's system until all the nutrition has been absorbed into the bird's system.

Typically, an owl will not eat more prey until it has emptied its system of the previous meal. If they do eat more, that food will be compacted into the previous remains. For that reason, pellets can range in size from under an inch to as many as four inches, and contain up to 4 to 5 prey!

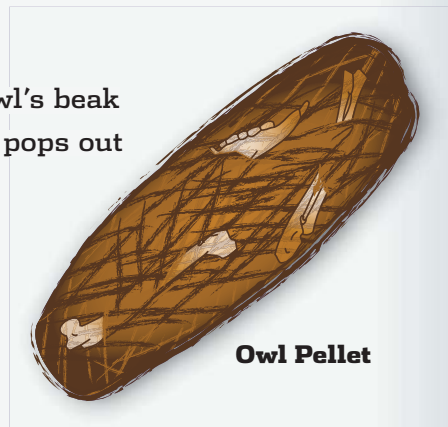




## How does the Owl Expel the Pellet?

When the owl is ready to gag up the pellet, it will turn its head at an angle or to the side and open its beak. Owls will often close their eyes and the facial discs will narrow. They rarely leave their perch during this process.

Stretching its neck, the owl's beak opens wide and the pellet pops out with little fanfare.



Owl Pellet



## Owl Pellet Dissection Lab

Barn Owl pellets have been chosen because these owls swallow small rodents and birds whole, and the resulting pellets generally contain the complete skeletons of their prey. Pellets begin forming within the digestive tract of an owl as soon as the prey is swallowed. Enzymatic juices break down the body tissues in the prey but



leave the bony materials and hair or feathers undigested. Depending upon the prey eaten, the undigested portions may include beaks, claws, scales, or insect exoskeletons. This type of material has little nutritional value and must be “gagged” from the system.

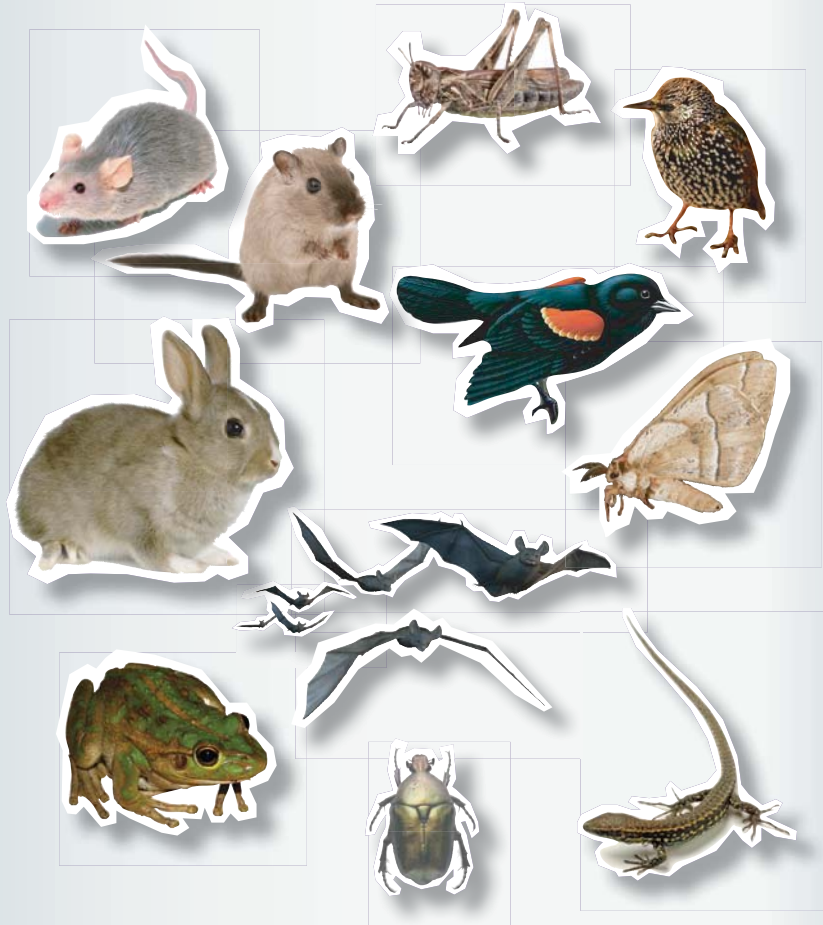
Predatory mammals such as bobcats and wolves have teeth to grind up bones and claws, and a digestive tract adapted to pass these ground parts. Owls, on the other hand, do not have teeth for grinding and cannot pass whole bone and claws through their digestive tract safely. Instead, these materials form a pellet that is surrounded with the hair or feathers of the prey consumed. The pellet is then orally expelled, or gagged, and the owl begins feeding again.

### You will need the following items in order to conduct a Barn Owl Discovery Kit Pellet Lab:

OBDK Bone Identification Charts	To aid in prey identification
Pencil	To record findings
Clean sheet of paper	To place extracted bones on
Two probes	To loosen fur from bones
Tweezers	To extract bones away from fur
Magnifying glass	To identify bone type
Paper towels	To absorb excess water
Antibacterial wipes	To sanitize work station
White glue	To secure bleached bones to bone chart
Tub of water diluted bleach	To whiten extracted bones

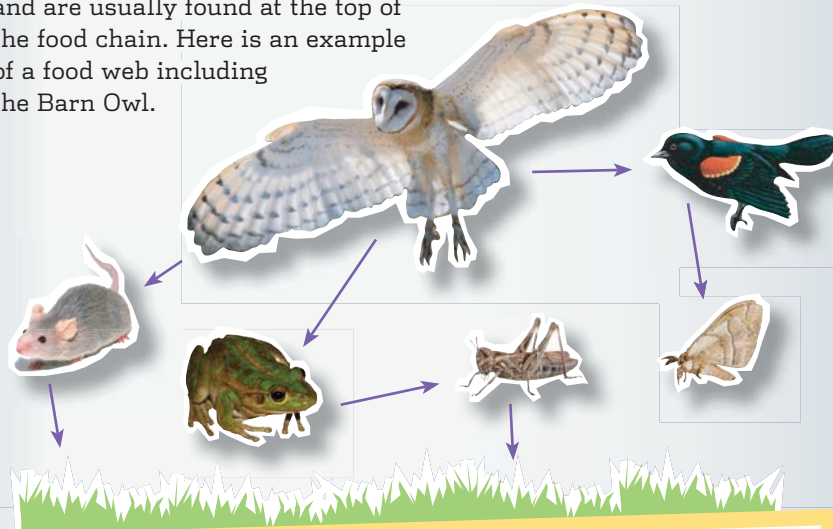


Scientists and teachers take advantage of this unique process by collecting these pellets and examining their contents. Since owls are not very selective feeders, these pellets can be used in a variety of instructional settings. The contents are a direct indication of what an owl has fed on. A one-year study of a particular Barn Owl revealed the following diet: 1,407 mice, 143 rats, 7 bats, 5 young rabbits, 375 house sparrows, 23 starlings, 54 other birds, 2 lizards, 174 frogs, 25 moths, and 52 crickets.



## Constructing a Food Web

Animals that eat other organisms for energy and growth are called consumers. There are three consumer levels found in a food web: primary, secondary and tertiary. Primary consumers are usually herbivores; they feed on photosynthetic products such as grass and seeds. Secondary consumers gulp down primary consumers. And tertiary consumers (carnivores) devour secondary consumers and are usually found at the top of the food chain. Here is an example of a food web including the Barn Owl.



**EXERCISE 1:** What other carnivores and herbivores would you add to the food web?

Listing these others, construct a food web, with the Barn Owl at the top.

_____	_____
_____	_____
_____	_____
_____	_____





## What's on the Outside?

Before you dissect the pellet, examine the outside of the pellet for clues to where it was gathered. Pellets are collected from a variety of places around the country. Use the chart below to see if you can determine where the Barn Owl might have gagged your pellet.

**What you might find:    Where owl gagged the pellet:**

- Milo Seeds → Open sheds
- Grain → Grain elevator
- Dirt → Cut banks and under trees
- Hay or Straw → Barns and hay sheds
- Feathers → Man-made nesting boxes
- Pine needles → Under evergreen trees

**EXERCISE 2:**

1. On your piece of paper, write down the clues that might indicate where your pellet was gathered.
2. Can you identify other items stuck to the outside of the pellet?

---

---

---

---

---

---

---

---

---

---



## What's on the Inside?

**EXERCISE 3:** Label a clean sheet of paper for each pellet you dissect, for example, pellet one, pellet two, etc.

**Note:** If you find that the pellets do not come apart easily, you can soak them in warm water to soften them.

Using the probes provided, begin to loosen the hair of the owl pellet. As bones are uncovered, carefully remove them using your tweezers and place them onto a properly labeled sheet of paper.

Take extra care to keep skulls intact and near the mandibles (see Owl Brand Discovery Kit Bone Identification Charts).

Continue to extract bones from the hair of the prey. Once you have found all the bones, you can begin identifying them by comparing them to the illustrations on the charts provided.

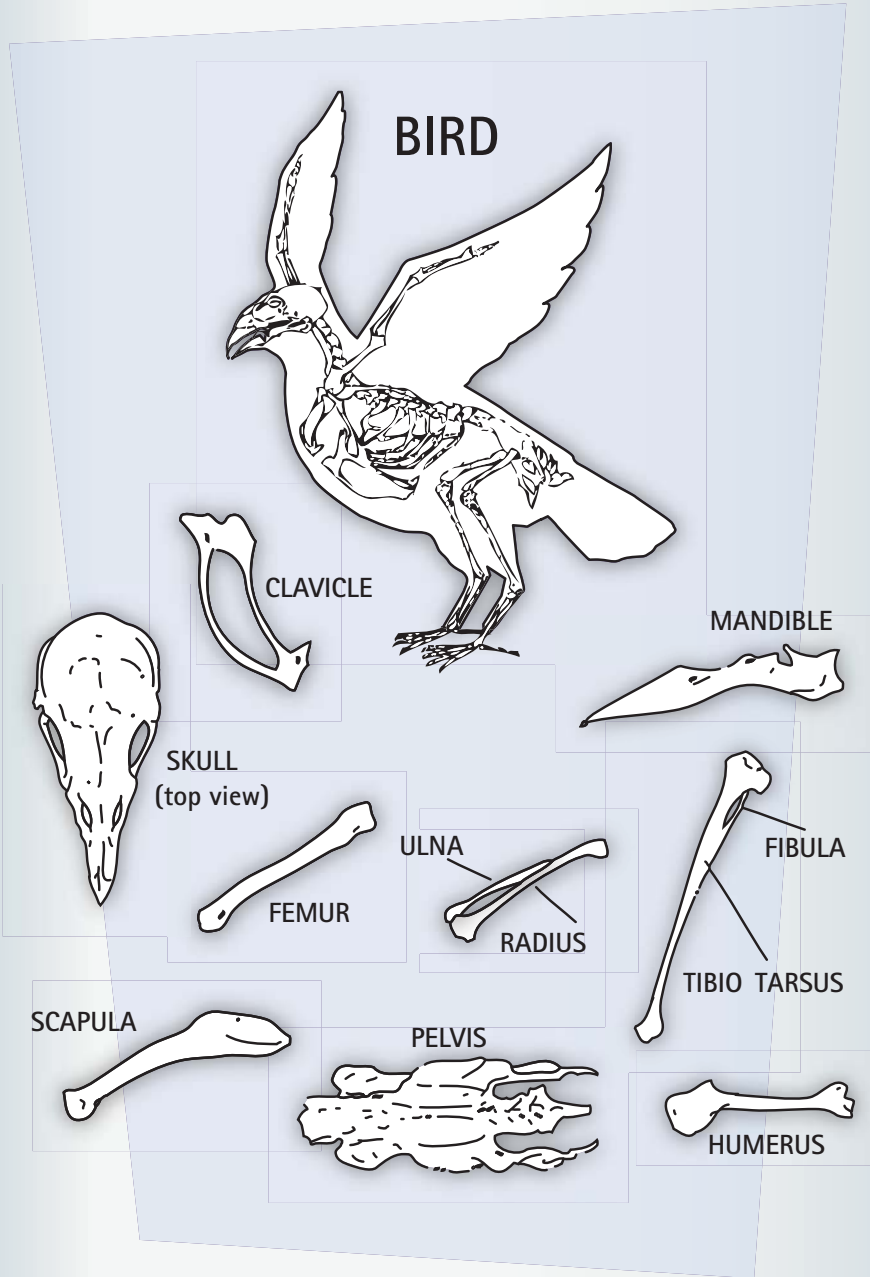


## Bleaching & Mounting the Bones to your Owl Brand Bone Identification Charts

### EXERCISE 4:

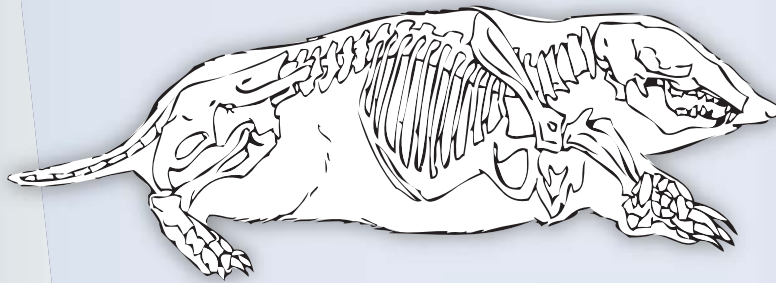
1. Keep the bones from each prey item separate by setting each set onto a separate clean (labeled) sheet of paper.
2. Place the bones into a tub of diluted bleach to whiten them. (Bleaching is Optional)
3. After the bones have been cleaned, set them onto a separate dry paper towel.
4. Using a magnifying glass and the Owl Brand Discovery Kits Bone Identification Charts, try to identify the type of skeleton that was found in your owl pellet.
5. Use white glue to attach the bones to the correct Bone Identification Chart.





# MOLE

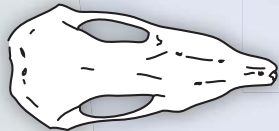
Scaparus orarius



CLAVICLE

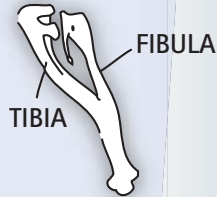


MANDIBLE



SKULL  
(top view)

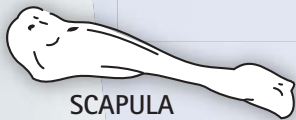
HUMERUS



TIBIA

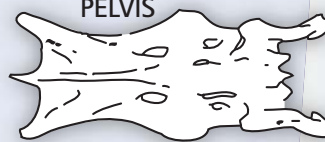
FIBULA

FEMUR



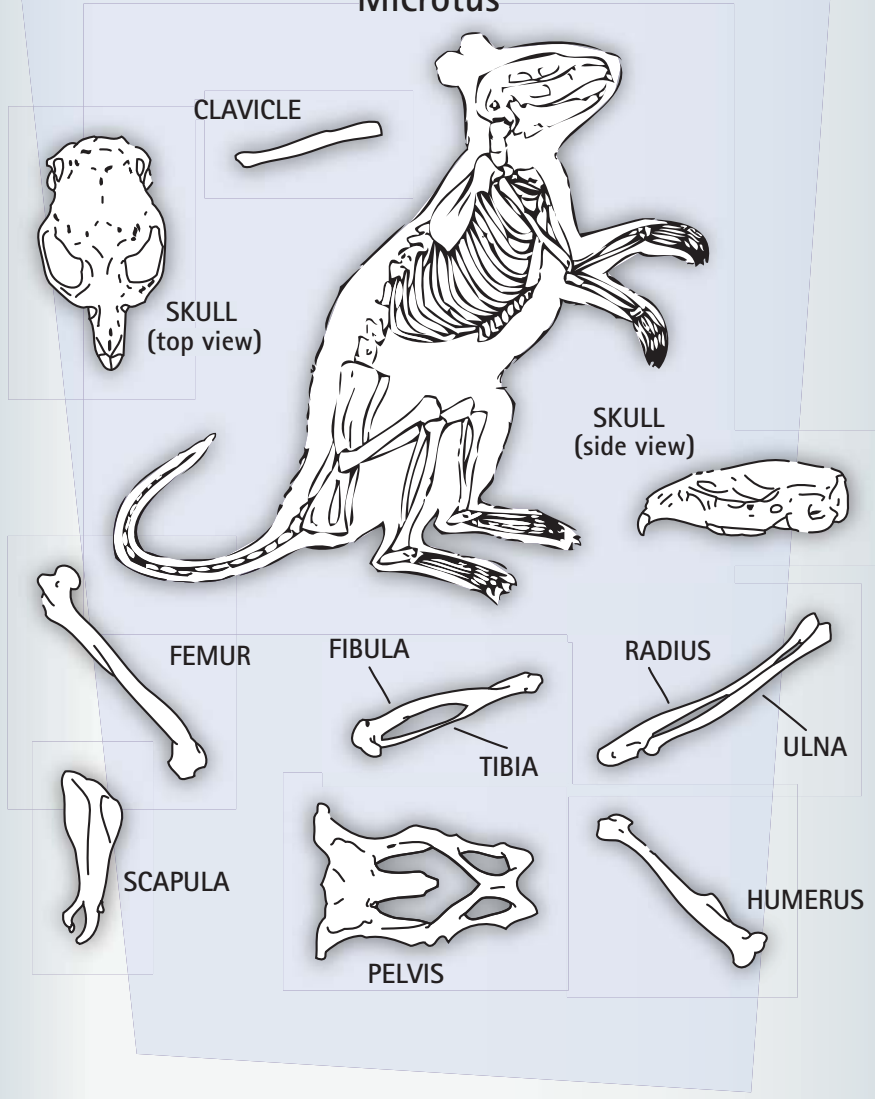
SCAPULA

PELVIS



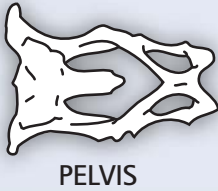
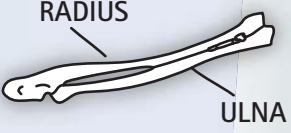
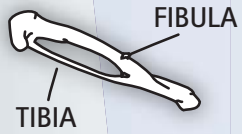
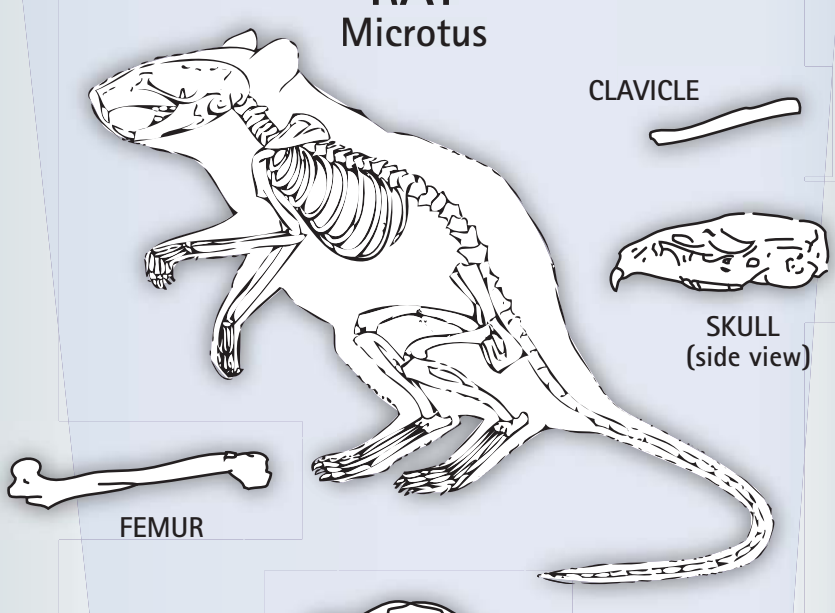
# MOUSE

Microtus



# RAT

Microtus



# SHREW

Sorex vagrans



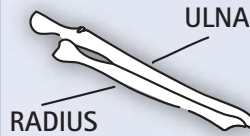
CLAVICLE



MANDIBLE



SKULL  
(top view)



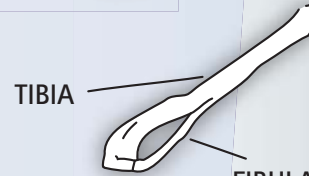
RADIUS  
ULNA



FEMUR



HUMERUS



TIBIA  
FIBULA



SCAPULA



PELVIS





# VOLE

Microtus

