



## What's that Skull? How to Identify What Critter It Was!

Wouldn't it be neat if you could identify a skull in the woods just by looking at it? There are a few distinguishing characteristics that you can see when analyzing a skull that can reveal to you what role it played in its environment. You will be able to tell how many legs it had, whether it was a predator or prey species and what its role was in the environment. With the help of a guide, you can identify exactly what animal you hold in your hands!

### Was it a Predator or Prey Species?

Location of the orbits or eye sockets-

- In the front of the head, pointed forwards, then the animal was more than likely a predator.
  - Why? With the eyes in the front of the skull, the organism has better binocular vision. This type of vision gives them a wider range of view and better depth perception. Predators need good depth perception because they need to be able gauge how far they need to pounce/jump to catch their lunch!
- If the orbits are off to the sides, then the animal was probably a prey species.
  - Why? With their eyes on the sides of their heads, they have better peripheral vision. This allows them to see more outside their range of view; they can see a predator sneaking up behind them.



Predator



Prey



Binocular Vision



Peripheral vision

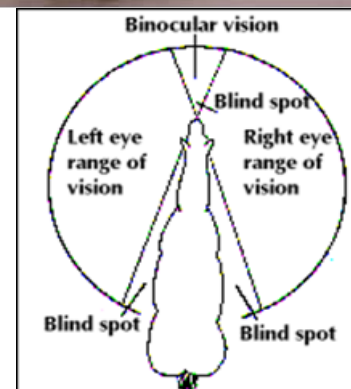
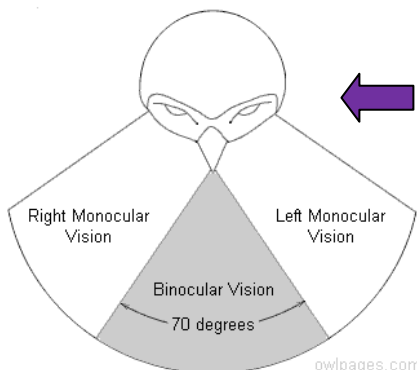
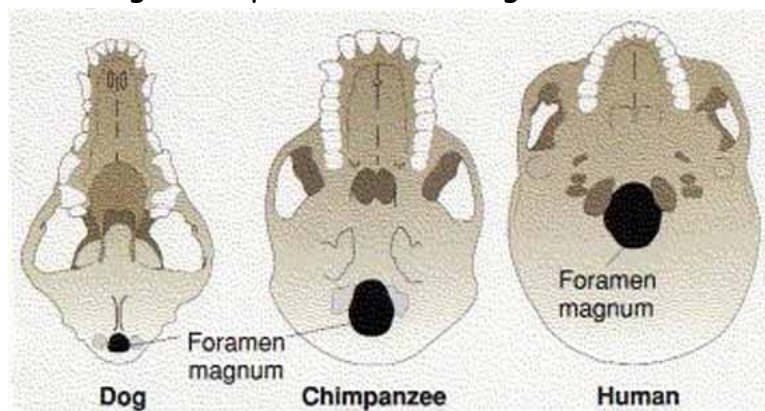


Figure 1: The horse has a large peripheral vision--and three areas of blind spots.

### Location of the Foramen Magnum-

This is where the spine enters the skull. It helps in identifying the type of skull you have by indicating how the animal moved.

- If this hole is near the bottom of the skull then the animal had a more upright stance.
  - Why? With the foramen magnum near the bottom of the skull, the spine would be more vertically aligned and the animal would have had an upright stance, like a human.
- If the hole is near the back of the skull, then the animal had a more quadrupedal (4-legged) stance.
  - Why? The skull would have been more horizontally aligned with the spine. This means that the head would have been held like a fox or a dog; more parallel with the ground.



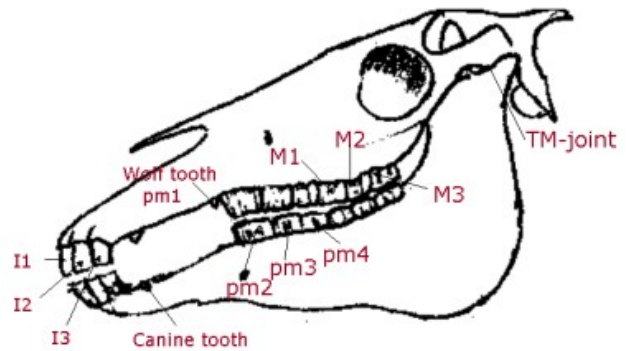
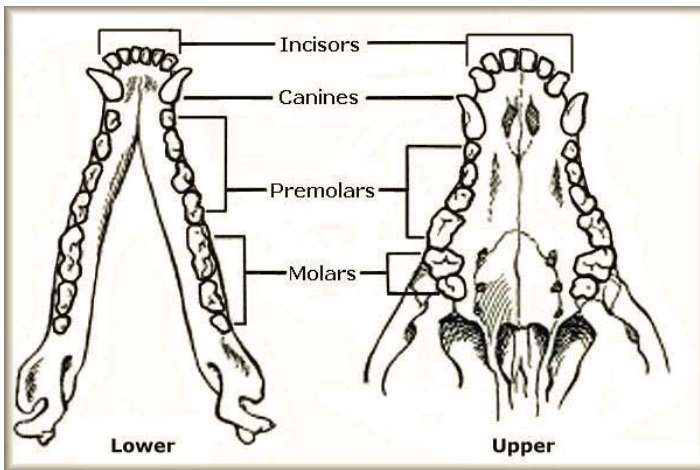
### What was its role? Herbivore vs. Carnivore vs. Omnivore

By looking at the teeth (or the remaining teeth) in the skull you can determine whether the animal was an herbivore, carnivore, or an omnivore. Each possesses distinct variations in their teeth that you can analyze to determine what its role was in the environment.

#### ● Types of teeth

There are four major types of teeth: incisors, canines, premolars, and molars. Carnivores have all four types, while some herbivores have just 2 or 3.

- *Incisors*- Sharp-edged teeth in mammals that are adapted for cutting, nipping, or gnawing. The incisors are located in the front of the mouth.
- *Canines*- Pointed conical teeth located between the incisors and premolars that are used for piercing, firmly holding the prey, and sometimes as weapons.
- *Premolars*- Any of eight bicuspid teeth in mammals, arranged in pairs on both sides of the upper and lower jaws between the canines and molars. Premolars are used to tear and grind food.
- *Molars*- Teeth with a broad, flat crown used to grind food and are located behind the premolars.



**Roles in the Environment**

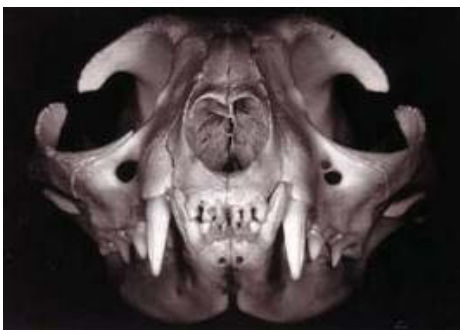
**Herbivore** - These animals eat plants. They will have flattened molars that will be smooth and flat; these are perfect grinding surfaces. They will either have extremely reduced canines or none at all. They will also have a large gap in between their incisors and premolars.

**Carnivore** - These species eat primarily meat. They have all four types of teeth. The canines are in the front of the mouth and are used for piercing and holding the prey; this is a distinguishing characteristic for these species.

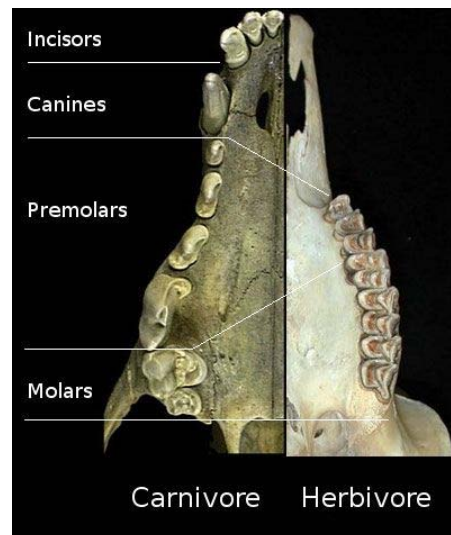
**Omnivore** - These animals consume both plants and animals. They have all four types of teeth. You can distinguish them from a carnivore from their molars. Omnivores will have molars that are similar to herbivores, broad and flat, while carnivores will have noticeably sharper molars.



Herbivore- note the lack of canines



Carnivore- note the large canines



## Some Good Sites and References

### **Websites:**

California Academy of Science Skulls Exhibit- great for looking at different kinds of skulls, not just mammals! <http://www.calacademy.org/exhibits/skulls/>

This website allows you to search for any animal in North America and will not only give you the skull but also its range and natural history.

[http://www.mnh.si.edu/mna/image\\_info.cfm?species\\_id=156](http://www.mnh.si.edu/mna/image_info.cfm?species_id=156)

### **Books:**

These are some really nice books that will aid in skull identification. *Animal Skulls* has very nice illustrations and pictures of skulls while *Skulls and Bones* is an excellent source for the functions of the bones. *Mammals of North America* is a great resource to have to show people what we have living in our backyards!

Elbroch, Mark. *Animal Skulls*. 1st ed. Mechanicsburg, PA: Stackpole Books, 2006. Print.

Kays, Roland, and Don Wilson. *Mammals of North America*. 2nd ed. United Kingdom: Princeton University Press, 2009. Print.

Searfoss, Glenn. *Skulls and Bones*. 1st ed. Mechanicsburg, PA: Stackpole Books, 1995. Print.

### **Pictures taken from the following sources:**

#### **Page 1:**

Owl monkey skull - [http://www.cabrillo.edu/~crsmith/owl\\_monkey.jpg](http://www.cabrillo.edu/~crsmith/owl_monkey.jpg)

Predator skull - <http://www.sangomaskulls.com/images/large/African%20wild%20cat.jpg>

Prey skull - <http://www.connecticutvalleybiological.com/images/sp3100.jpg>

Binocular vision - <http://www.owlpages.com/articles.php?section=Owl+Physiology&title=Vision>

Peripheral vision - [http://www.gatedhorses.net/Articles/Safety/fs\\_safety\\_diagram.gif](http://www.gatedhorses.net/Articles/Safety/fs_safety_diagram.gif)

#### **Page 2:**

Foramen Magnum-[http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/F/Foramen\\_magnum.jpg](http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/F/Foramen_magnum.jpg)

#### **Page 3:**

Herbivore teeth- <http://baynature.org/articles/jan-mar-2009/dem-bones-dem-bones/9-166.jpg>

#### **Page 4:**

herbivore vs carnivore teeth-

<http://www.washington.edu/burkemuseum/collections/mammalogy/mtm/images/teeth.jpg>

Carnivore skull- <http://www.saburchill.com/images02/080106029.jpg>

Mandible/maxilla- <http://www.donnerbergrottweilers.com/graphics/rottweiler-teeth/upper-and-lower-teeth-diagrams.jpg>

#### **“What is it ?” Page:**

Deer skull- [http://www.skullsite.co.uk/Axis/axis\\_latF.jpg](http://www.skullsite.co.uk/Axis/axis_latF.jpg)

Cat Skull- <http://picsicio.us/image/1cb5a384/>

Fox skull- <http://www.nhc.ed.ac.uk/images/collections/mammals/carnivora/redfoxskull.jpg>

Possum skull- [http://aardvarks.files.wordpress.com/2007/12/opossum\\_skull.jpg](http://aardvarks.files.wordpress.com/2007/12/opossum_skull.jpg)

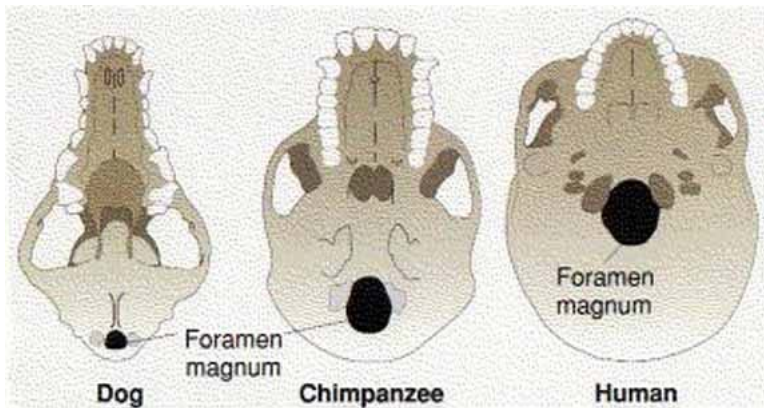
Rabbit skull- <http://sabinocanyon4kids.com/images/rabskul.gif>

# The "What is it?" Checklist!

- 1.) Location of orbit (eye socket): In the front of the skull.....predator  
 Near the sides of the skull.....prey



- 2.) Number of legs: Foramen magnum directly below.....two legs  
 Foramen magnum in the back .....four legs



- 3.) Types of teeth: Has all four.....carnivore or omnivore  
 Molars and premolars more broad and flat.....omnivore  
 Lacking large canines.....herbivore

