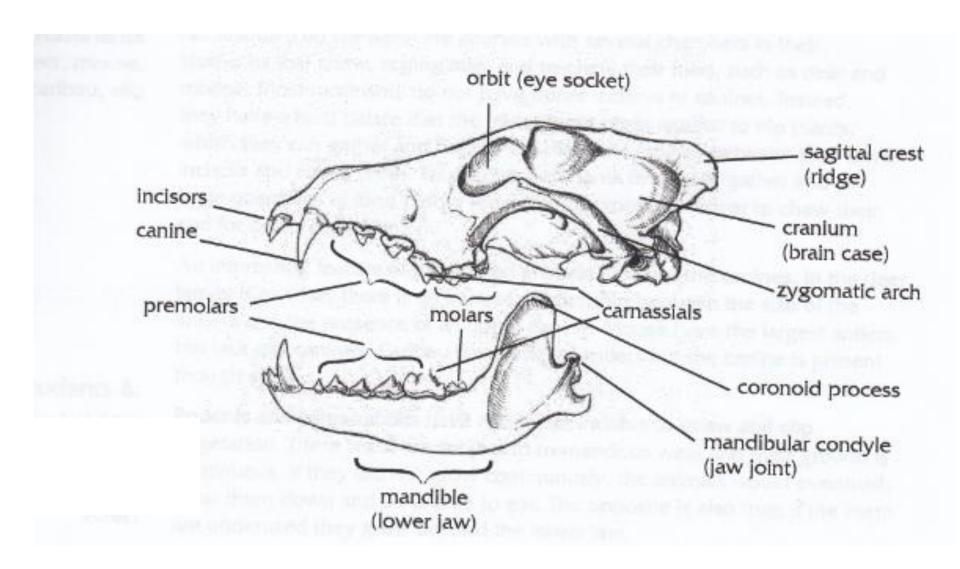
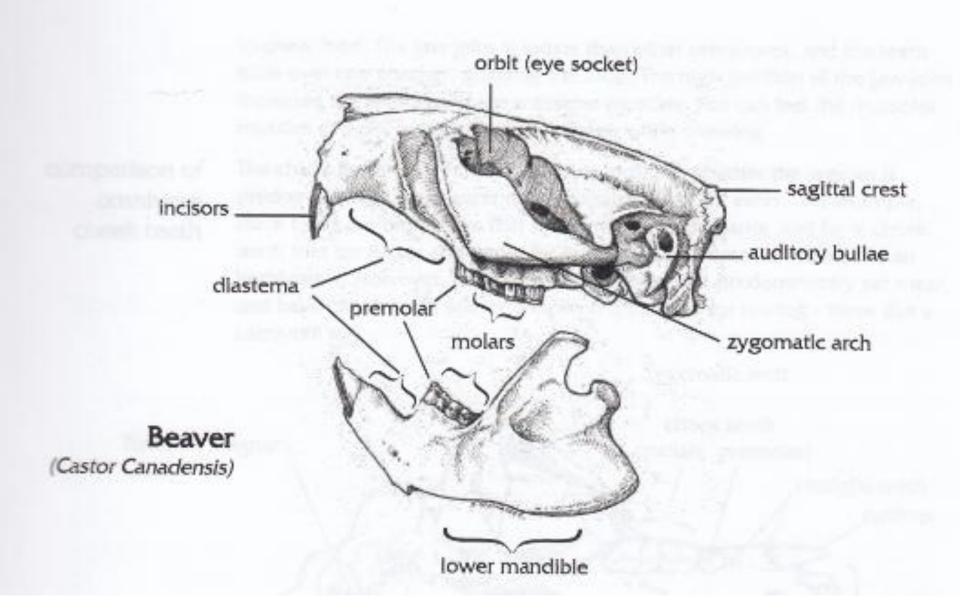


### Skull ID and Terms To Know





### Dental Formulas

The dental formula is the standard form for recording the number and type of different teeth a species has. The number and type of teeth are often major clues when identifying the skulls of similar species.

The dental formula of the marten is:

$$\frac{3}{13}$$
,  $C^{\frac{1}{1}}$ ,  $P^{\frac{4}{4}}$ ,  $M^{\frac{2}{3}} = 42$ 

I = incisor	3 on upper left side	P = premolar	4 on upper left side
	3 on lower left side		4 on lower left side
C = canine	1 on upper left side	M = molar	2 on upper left side
	1 on lower left side		3 on lower left side

The **left side** of the formula represents the number of teeth, upper and lower, on one side of the jaw. The **right side** of the formula is the **total number** of teeth in the skull. This is double the total of teeth on the left side of the formula since it includes **both sides** of the upper and lower jaw.

#### Horns



A horn is a slow growing, permanent bone. Homs are seen in the cattle family (Bovidae), which in Alaska includes bison, Dall sheep, mountain goats and muskoxen. Both males and females of these species have homs, although the males' are generally larger.

The center of the horn is a spike of bone that is fused with the skull. A hollow outer cone of true horn substance sheaths this bony core. Neither the bone core nor the outer sheath is ever shed.

Horns are not shed annually but are permanent throughout the life of the animal. Horns grow from the base, and an annual ring will show on the outer sheath for each year of growth. Annual rings can be counted and used for determining age.

#### **Antlers**

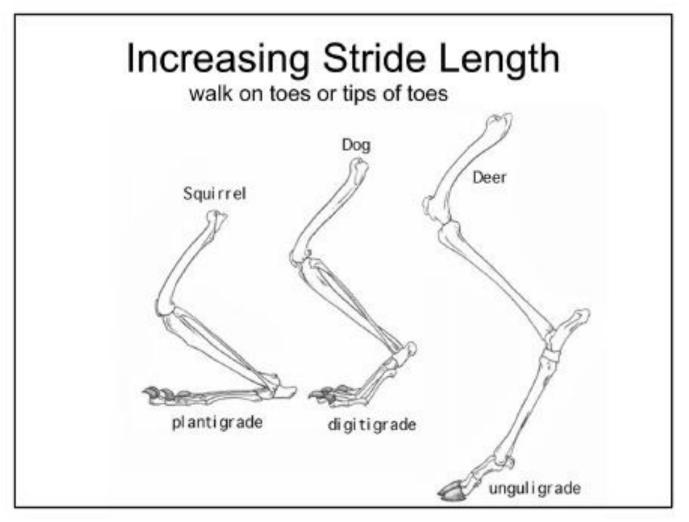


Antiers are also made of bone growing out of the skull, but are faster growing and temporary. Antiers are found in the deer family (Cervidae), which in Alaska includes moose, Sitka black-tailed deer, caribou, reindeer and elk. Generally only males have antiers, except for caribou, where females also carry antiers, although smaller than the males'.

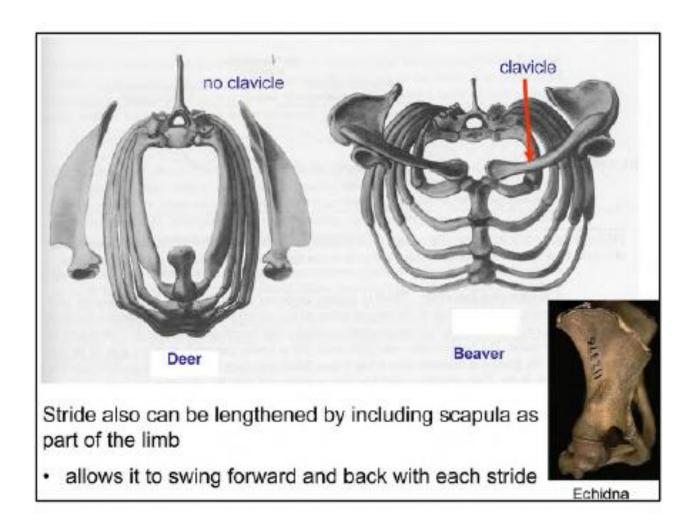
Antiers are shed annually (deciduous), usually in late winter, and begin growing again shortly thereafter. During growth, antiers are covered by furry 'velvet,' which is a layer of skin and soft, short hair. During the rutting season, the velvet dries up, and the animal scrapes or rubs it off. Later a ring of cells breaks down the bone at the base of the antiers, and the antiers fall away from the skull.

Antler growth depends a great deal upon the animal's health. The number of antler points does not indicate a deer's age.

### Mammal Movement

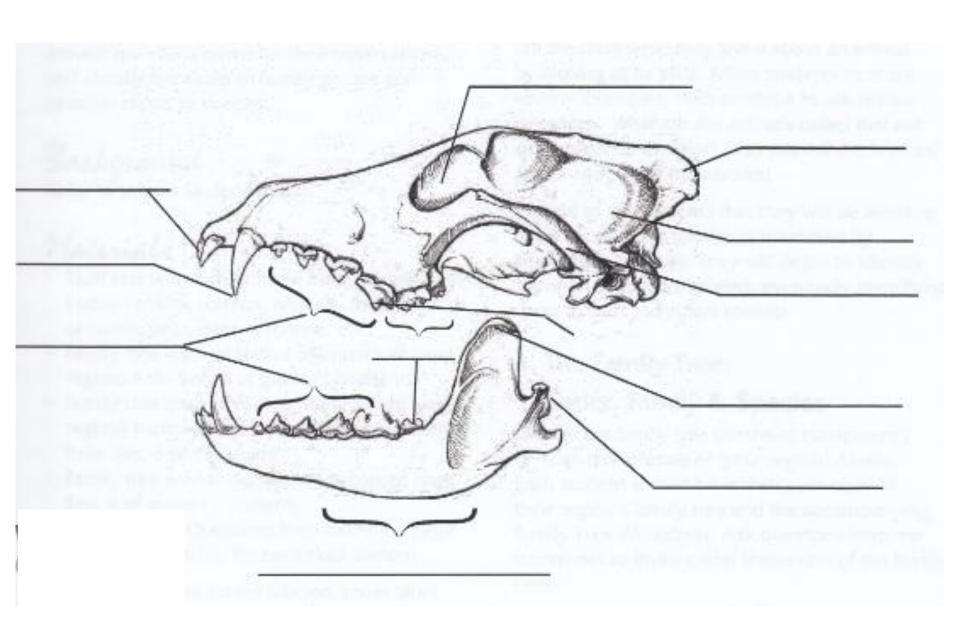


The unguligrade posture increases stride length and therefore increases speed without an increase in stride rate. This strategy requires less energy. Digitigrade posture increases stride length, but to a lesser degree.

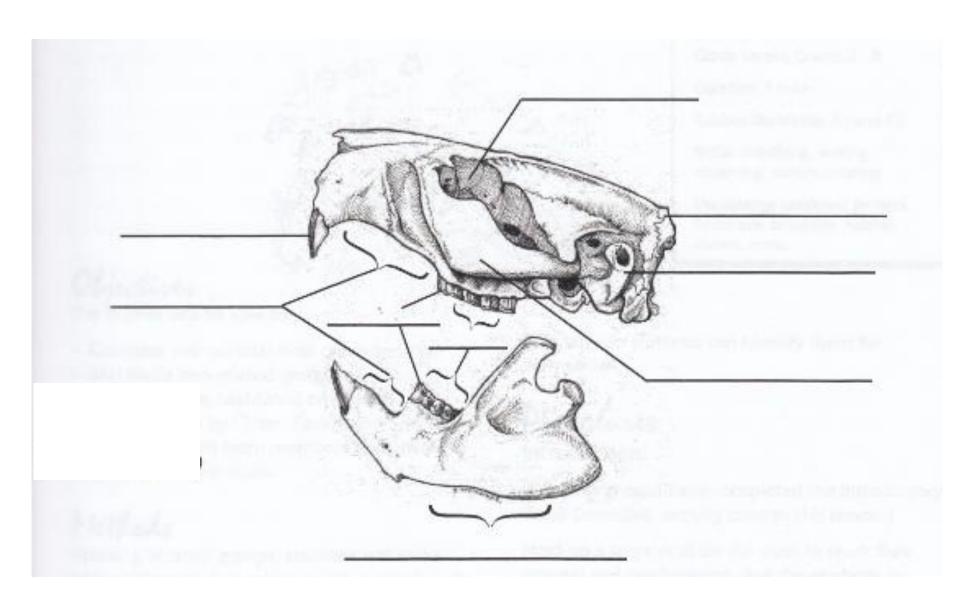


The loss of the clavicle allows the forearms to swing back and forth more freely because the scapula moves as part of the limb, thus lengthening the stride and increasing potential for speed. Compare this to stronger but much less mobile arrangements in the beaver and echidna.

### Fill in the blanks:



### Fill in the blanks:



### 7. Glossary of terms

anatomy: The structure of an animal or parts of an animal.

Artiodactyla An order of the hoofed mammals which have an even

number of toes; this order includes deer, cows, sheep,

goats, moose and caribou.

auditory bullae The bulbous bony structures that encase the inner ear.

binocular vision The type of vision in which both eyes focus on a single

object at the same time, forming one three-dimensional image.

Canidae The dog family; includes fox, coyote, and wolf.

canine The large, pointed tooth of a carnivore or the incisor-like, fourth tooth of a

herbivore.

carnassial teeth A large pair of bladelike teeth that come together with a scissor action.

carnivora The order of mammls that are primarily meat eaters.

carnivore An animal that predominantly eats meat.

Castoridae The beaver family; beaver is only member of this family.

Cervidae The deer family; includes moose and caribou.

cheek teeth A collective name for premolars and molars.

class A sub-grouping of animals; class Mammalia includes all mammals.

cranium The part of the skull that encloses the brain..

Cricetidae A mouse family; includes voles, lemmings, and muskrat.

dentition The number, kind, and arrangement of teeth in upper and lower jaws.

dentine The soft material in a tooth; usually, but not always covered by enamel.

deciduous teeth The first set of teeth (baby teeth) which are shed and replaced by adult teeth.

enamel The hard covering of exposed part of tooth.

evolution(ary) A gradual process over time during which an organism changes form.

Family A grouping of similar organisms ranking below an order and above a genus.

Felidae The cat family; includes lynx.

foramen magnum The largest hole in a skull through which the spinal cord passes.

foramina The holes in a skull that provide passage for nerves and blood vessels.

furbearer An animal that is valued for its fur. A lynx is a furbearer but a moose is not.

game animal An animal harvested usually for meat but sometimes for its hide, too.

genus A grouping of similar organisms ranking below a family and above a species;

it is the first part of the animal's scientific name. For example, Lepus is the genus of Lepus americanus, the snowshe hare. Genus and species are underlined or

italicised in scientific writing.

herbivore An animal that eats plants.

incisor A chisel-shaped tooth adapted for cutting located in the front of the mouth.

Most animals have three on each side of the upper and lower jaw.

Lagomorpha The order which includes hares, pikas, and rabbits.

mammal Belonging to the class Mammalia; distinguished by self-regulating body tem

perature, hair, and in females, milk production for feeding young; includes

hare, beaver, moose, wolf, bear and humans.

mandible The lower jaw.

mandibular condyle The small process on the end of the mandible that fits into a groove in the skull to

form the jaw joint.

molars The teeth in the back of the mouth; these teeth and the premolars collectively are

called cheek teeth. Molars have no deciduous (milk teeth) predecessors.

Mustelidae The ermine family; includes mink, marten and wolverine.

omnivore An animal that eats both plants and animals.

orbit The cavity in the skull which houses the eyeball.

order A grouping of closely related organisms ranking below the class and above the

family categories.

phylogeny The historical (evolutionary) development of a species of animal (or plant).

predator An animal that kills and eats other animals.

premolars The teeth preceding the molars. These and the molars collectively are called

cheek teeth. Unlike molars, these are deciduous predecessors to premolars.

prey The animals killed and eaten by predators.

Rodentia The order which includes mice, voles, squirrels, muskrat, and beaver.

rostrum The nose, snout.

sagittal crest A raised ridge on top of the braincase; most prominent in woves and wolverine.

species The smallest unit of classification. The 'americanus' in Lepus americanus

(snowshoe hare) is the species name.

taxonomist One who studies the classification of living things.

tooth type For the purposes of this guide, tooth type refers to whether the surfaces of the

teeth are flat or sharp, and if they are used for shearing, tearing or grinding.

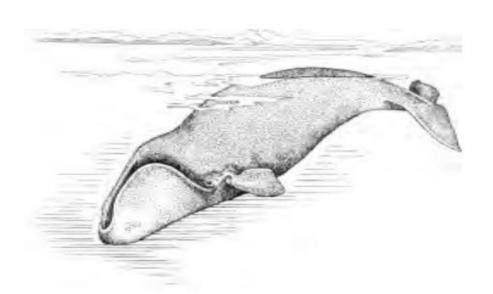
Ursidae The bear family; includes black, brown and polar bears.

vestigial (teeth) Teeth that have become reduced in size through reduced use over evolutionary

time.

zygomatic arch: The cheek bone; the arched bone that extends from below the orbit to the back

of the skull.



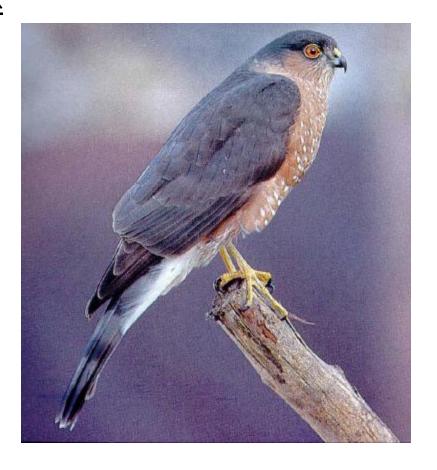
# Bill Shape and Use

- Match sample # with bill types below:
- A) Conical bill for ?
- B) Probe for ?
- C) Filter feeder for ?
- D) Hooked bill for ?
- E) Chisel bill for ?
- Birds don't have teeth. Too heavy and will make body off balance for flight

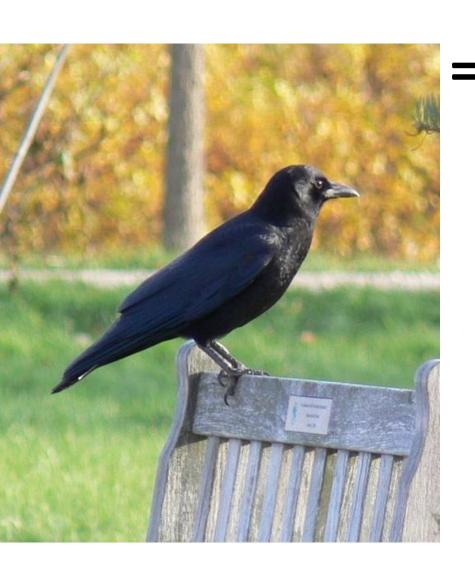
# Raptor ID Tips: **SIZE**



American Kestrel,Merlin,or Sharp-shinnedHawk



# Raptor ID Tips: SIZE



Peregrine, Broad-winged
 Hawk, Red- shouldered
 Hawk, Coopers Hawk

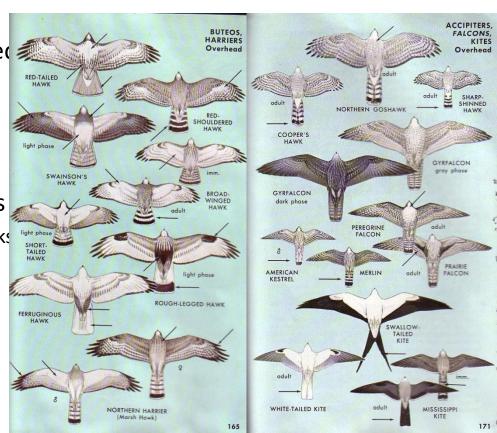


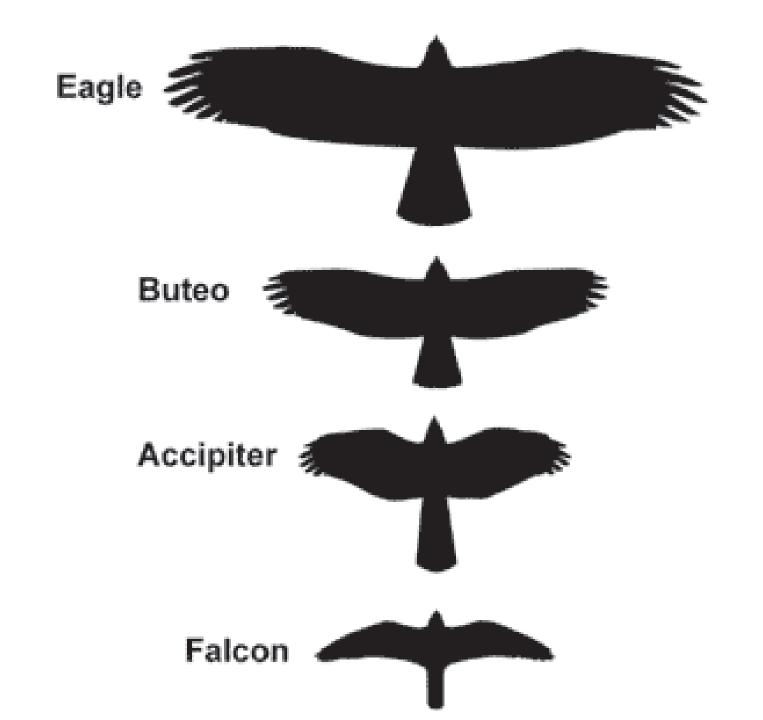
# Raptor ID Tips: **SHAPE**

I. Long, narrow wings (typically pointed and narrow tail: Falcons (Kestrel, Merlin, Peregrines, Gyrfalcon)

II. Short, broad wings with rounded tips and long, narrow tail: Sharp-shinned Hawks Coopers Hawk, Northern Goshawk

III. Broad wings, relatively long and rounded at tips. Tails short and broad: Rough-legged Hawk, Red-tailed Hawk, Red-shouldered Hawk, Broad-winged Hawk





## Raptor ID Tips: COLOUR

- Top and/or bottom of wing colour and pattern?
- •Back colour?
- Chest / Underparts streaked(vertical or horizontal)? Solid colour?

# Raptor ID Tips: HABITAT

•Forest Interior?

Hardwood/Softwood/Mixed?

- •Forest Edge?
- Open Areas/Agricultural?
- •Wetlands?

#### EAGLES



Bald eagle



Golden eagle





Turkey vulture

KITE



Ferruginous hawk



Swainson's hawk



Red-tailed hawk

OSPREY

Kite



Osprey

#### ACCIPITERS



Northern goshawk

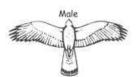


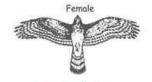
Copper's hawk



Sharp-shinned hawk

HARRIERS





Northern harriers

#### FALCONS.





Merlin



Prairie falcon



Peregrine falcon

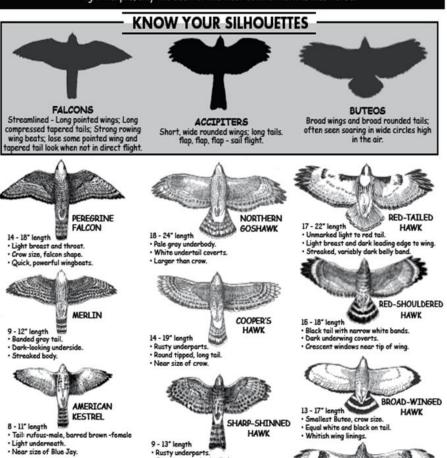
#### OWL



Owl

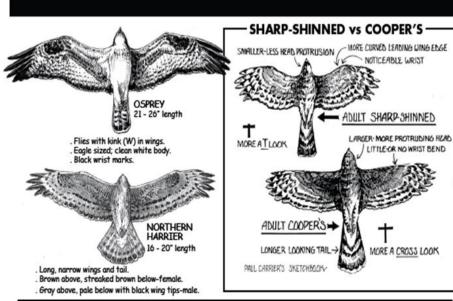
#### A GUIDE FOR HAWKS SEEN IN THE NORTHEAST

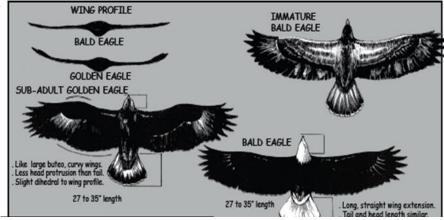
Because many hawks differ in appearance due to age and various dark and light morphs, only the adult of the most common form is illustrated.



· Square or notched tail tip.

· Near size of Blue Jay.







A

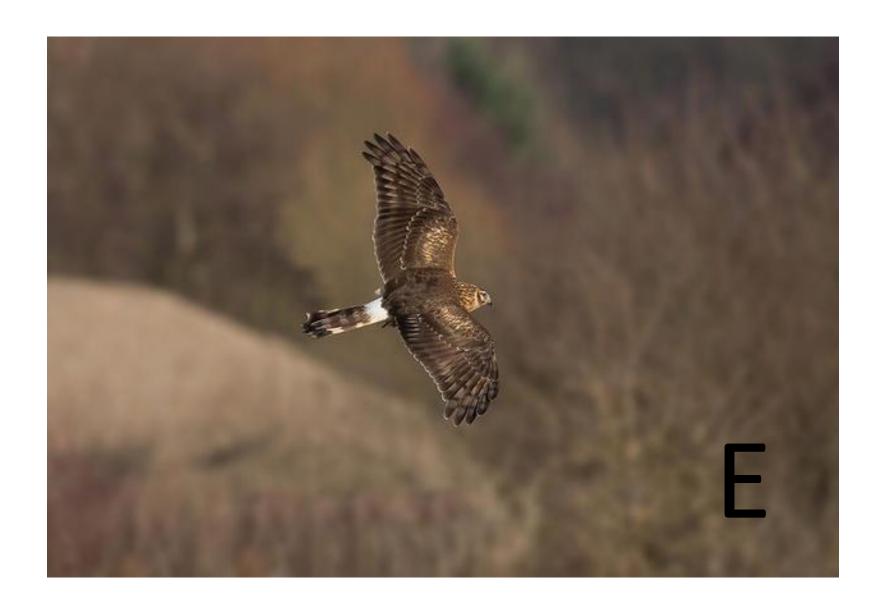
B





C









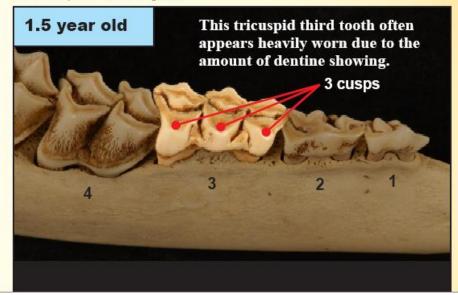


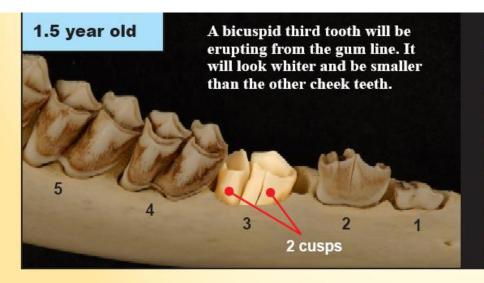
# Field Guide to Aging White-Tailed Deer Indiana Department of Natural Resources

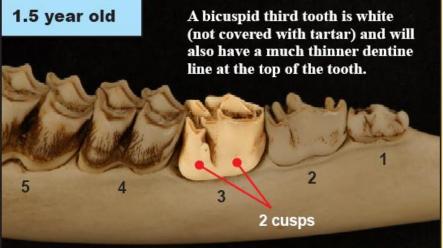


Any deer with less than 6 cheek teeth is a fawn.

Depending on exact age, 1.5 year olds may look like any one of these three 1.5 year old examples.









# Field Guide to Aging White-Tailed Deer Indiana Department of Natural Resources



