BIRD REVIEW

By Kelly Riedell/Brookings Biology

Give the characteristics of birds:

ENDOTHERMIC (warm blooded)
4 chamber heart
Feathers/wings
Highly efficient respiratory system
Lightweight/rigid skeleton
Oviparity (lay amniotic eggs)
Beak

Match the BIRD body part with its function

Grinds & mashes food gizzard

voice box syrinx

Where acid and enzymes start to digest food proventriculus

Makes bile liver

Hold air but don't exchange gases Air sacs

Thin fan-like membrane that holds the small intestine in place.

mesentery

The upper portion of the stomach where digestive enzymes and acid chemically break down food is called the

proventriculus

Lower muscular portion of the stomach where food is squeezed and mashed

GIZZARD

Thick, featherless patch of skin on the abdomen of a bird that helps to keep eggs warm when the bird sits on the nest.

Brood patch

Scientist who studies birds

Ornithologist

Pouch on the esophagus that stores food waiting to be digested

crop

Match the BIRD body part with its function

Attachment for flight muscles sternum

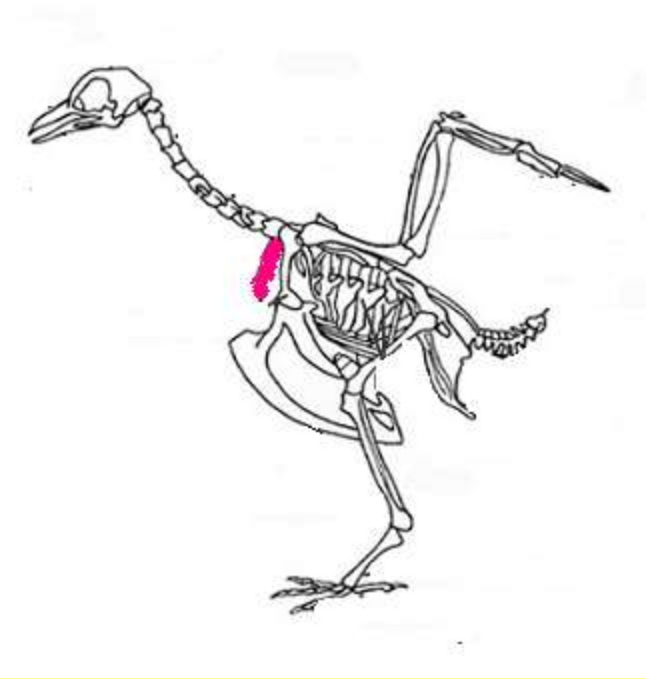
Exit opening for urine, feces, sperm/eggs vent

Processes nitrogen waste for kidneys liver

Stores glycogen liver

Baby birds that are active when they hatch and come from nests with many eggs that have a long incubation time

precocial



This bone that stabilizes the shoulders is called the

furcula

Match the BIRD body part with its function

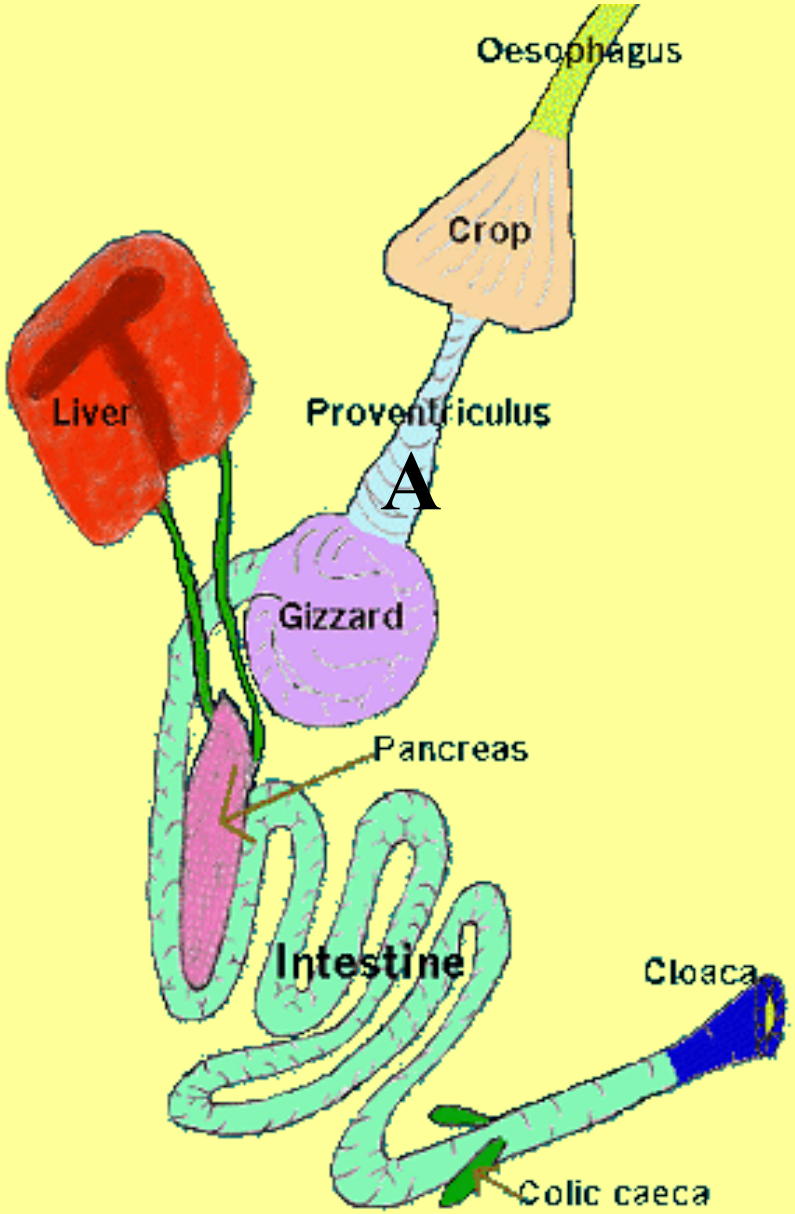
Ringed windpipe trachea

Receives sperm/eggs, urine and digestive waste cloaca

Pouches where microorganisms help digest plant material Colic caeca

Stores bile Gall bladder

Regulates heart rate, blood pressure,and metabolism Thyroid gland



What is the function of structure A?

Place where acid and digestive enzymes break down food

Tell 2 ways the DIGESTIVE system is modified to help in flight.

1. FAST EFFICIENT system-
   fuels endothermic metabolism for more energy
2. TWO PART STOMACH- proventriculus & gizzard
   separates functions to move food faster
3. CROP-
   stores extra food so food moves through faster
4. COLIC CAECA- break down plants
5. LONG SMALL INTESTINE- absorbs more nutrients
6. SHORT LARGE INTESTINE- less water absorbed
   so waste is released quickly (less weight)

TRUE or FALSE

The heart of a bird is like that of a frog

False

Frogs have 3 chambers; birds have 4

Gland that regulates heart rate, blood pressure, and metabolism

THYROID

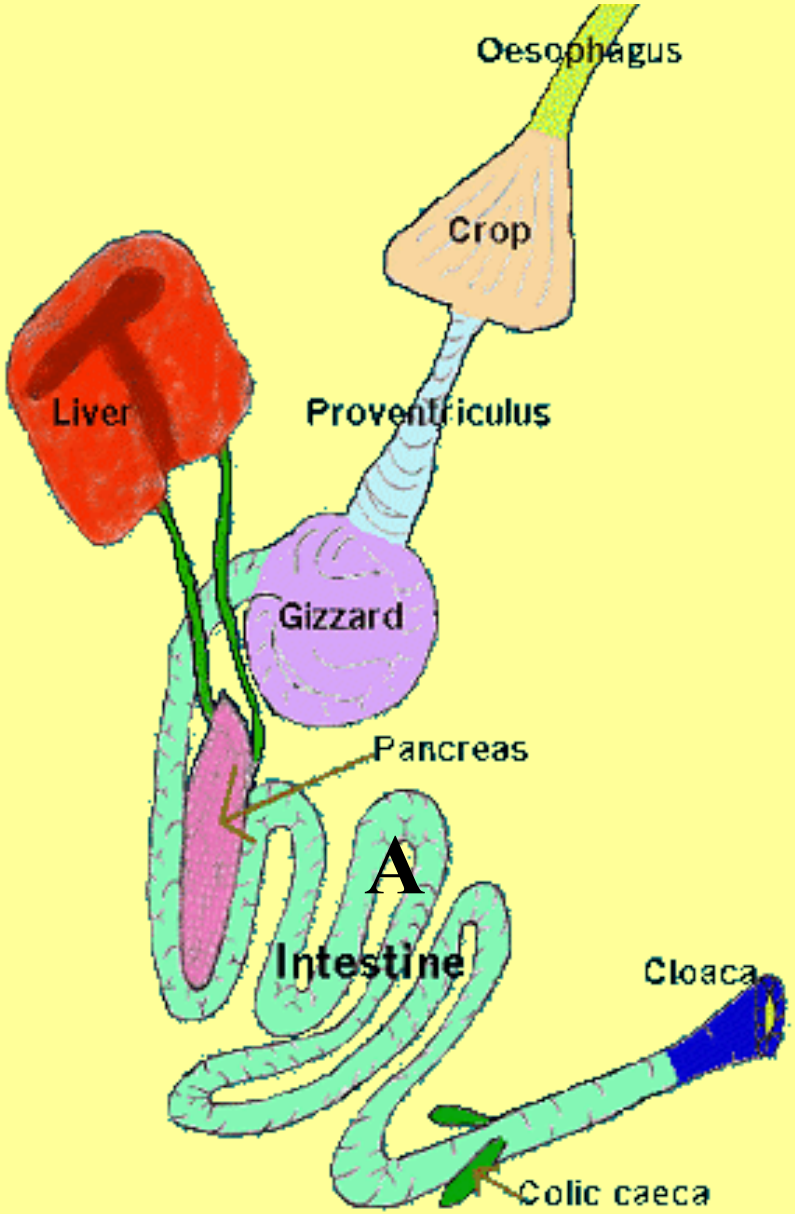
Eggs in birds are fertilized in

Ovary oviduct cloaca vas deferentia

oviduct

The voice box in a bird that produces its song

syrinx



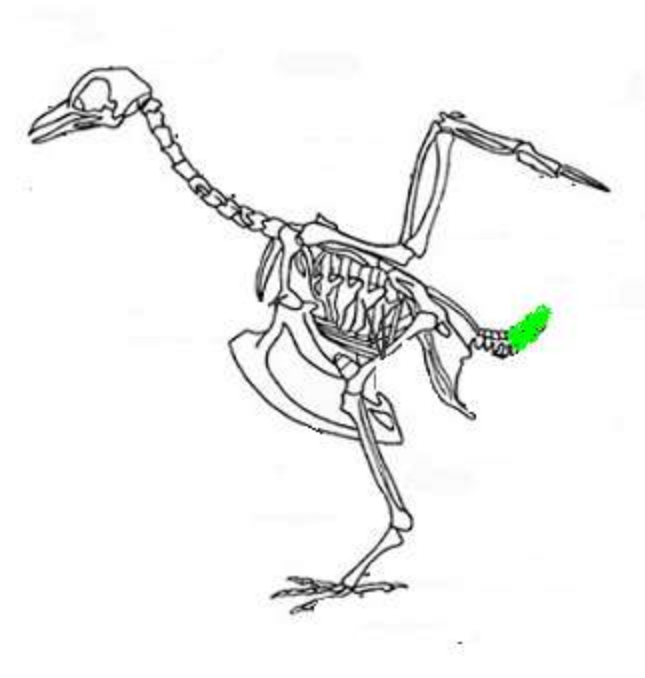
What is the function of structure A?

Finishes digestion & absorbs nutrients

Tell one way the Respiratory system is modified to help in flight

Air sacs store extra air to provide additional oxygen when inhaling AND EXHALING

Air sacs extend into bones to decrease density



This bone that supports the tail feathers is called the

_____

pygostyle

Space at the end of the digestive system that collects digestive waste, uric acid from the kidneys, and eggs and sperm before they exit the body.

cloaca

Place in the respiratory system where gases are exchanged

Lungs air sacs syrinx trachea

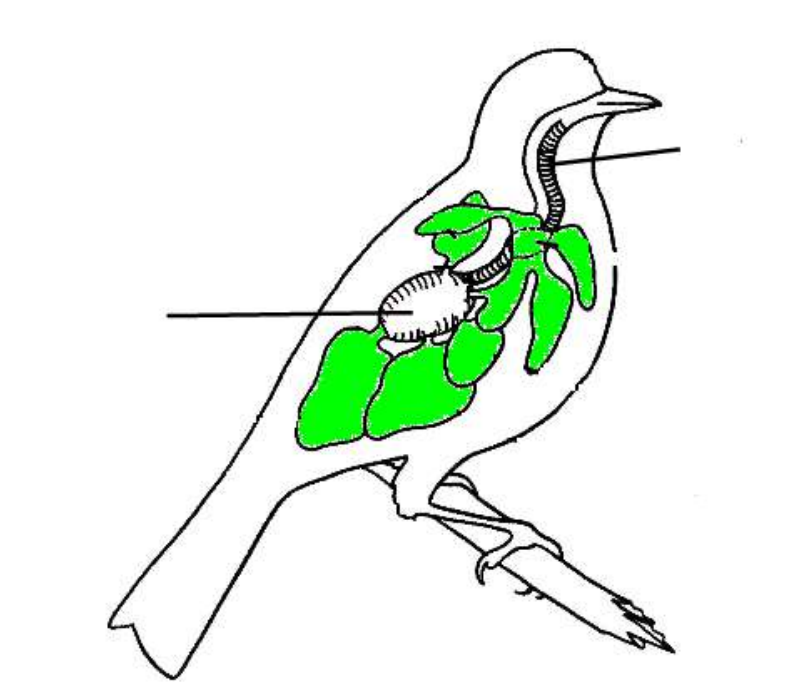
Lungs
(Air sacs only store air until it moves into t he lungs)

Birds belong to this CLASS:

AVES

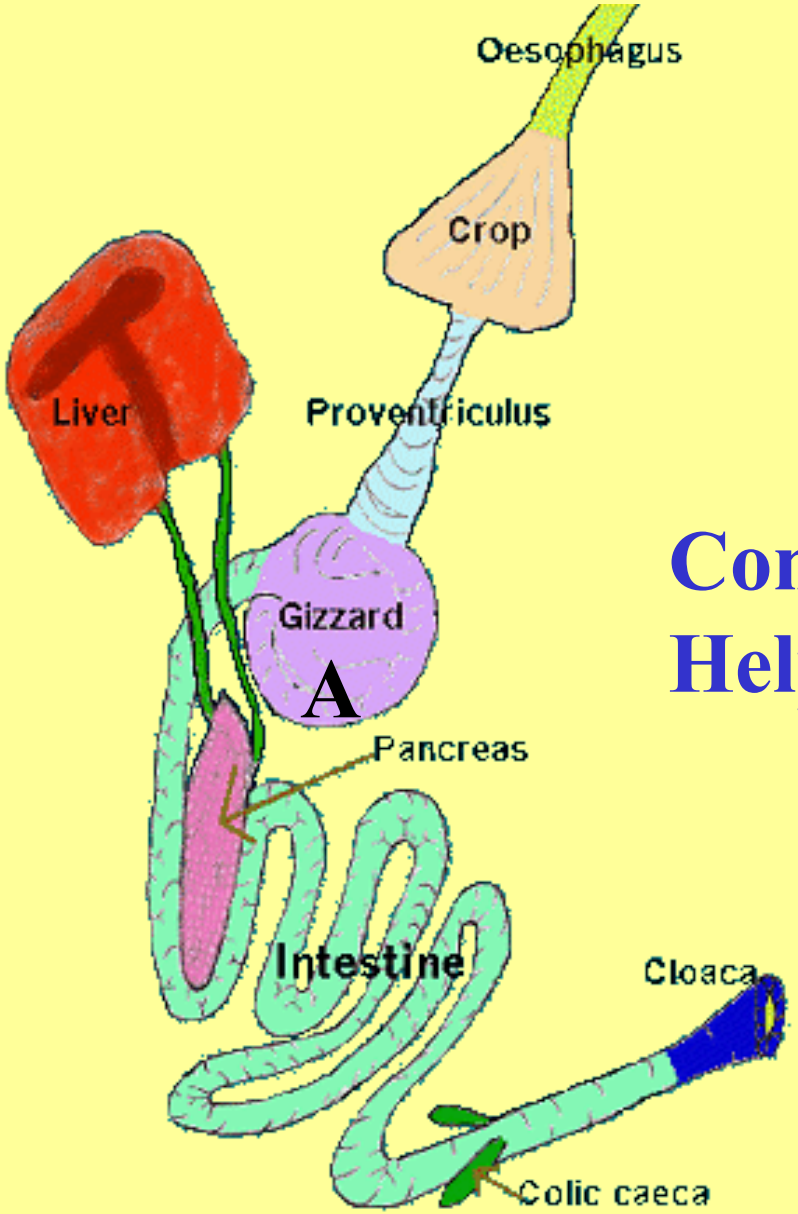
Birds that are naked, blind, and helpless when they hatch and come from nests with few eggs that have a shorter incubation time.

altricial



These structures attached to the lungs are

Air sacs

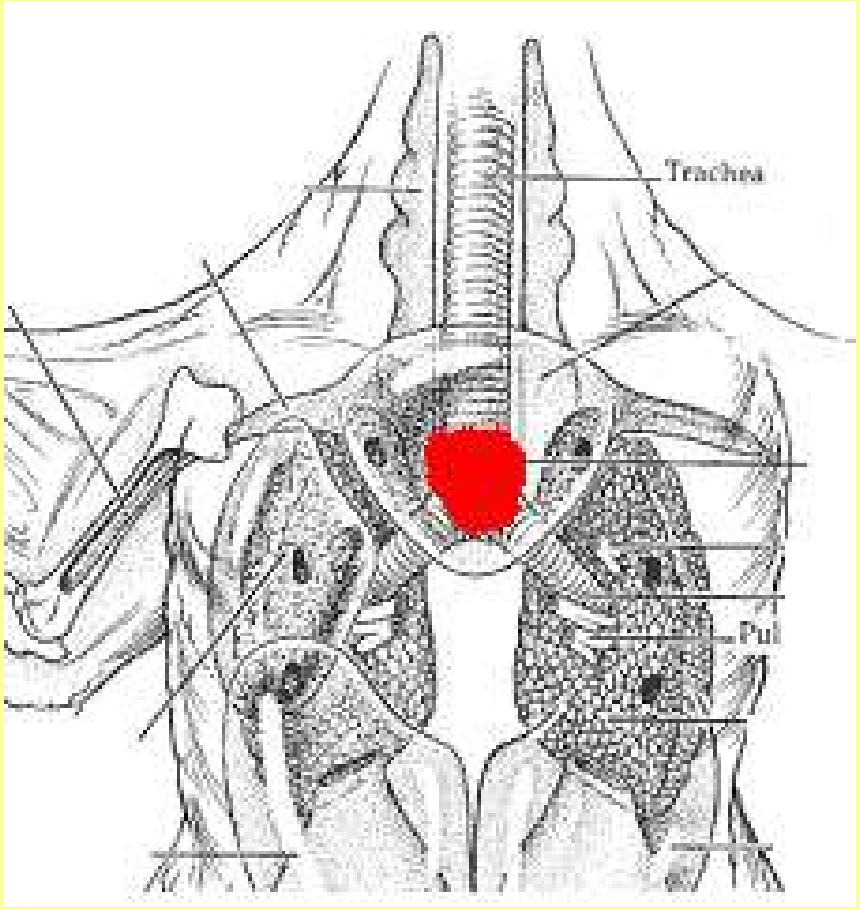


What is the function of structure A?

Contains small rocks to
Help squeeze and mash food

Tell one way the SKELETAL system is modified to help with flight.

1. **BONES ARE HOLLOW = less dense**
2. **BONES ARE FUSED = sturdy**
3. **AIR SACS extend into bones to make them less dense**
4. **FURCULA –stabilizes shoulder**
5. **PYGOSTYLE- supports tail for steering/braking**
6. **BIG STERNUM- attaches flight muscles**



What is the function of this colored structure located between the trachea and bronchi?

= syrinx

Voice box for singing

Fused lower portion of the spine that supports the tail feathers

pygostyle

Nutritious milk-like fluid produced in the crop of some birds like pigeons to feed their young

Crop milk

Gland located at the base of the tail that the bird uses to coat its feathers to make them waterproof.

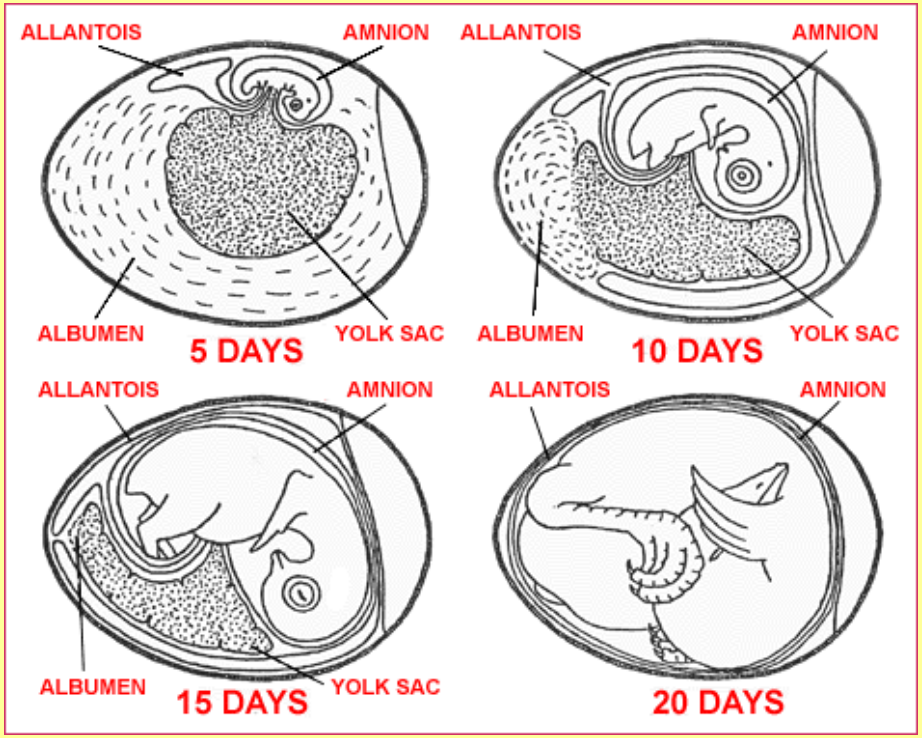
Preen gland

Fused collarbone commonly called a "wishbone" which helps to stabilize the shoulders during flight

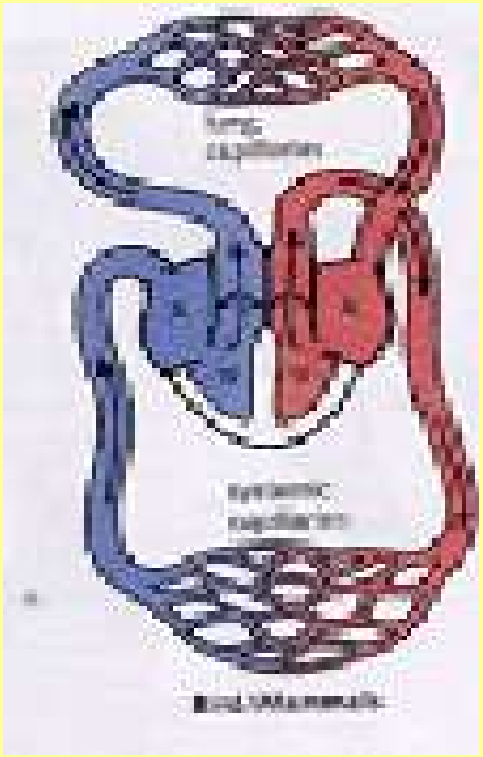
furcula

Type of egg laid by birds

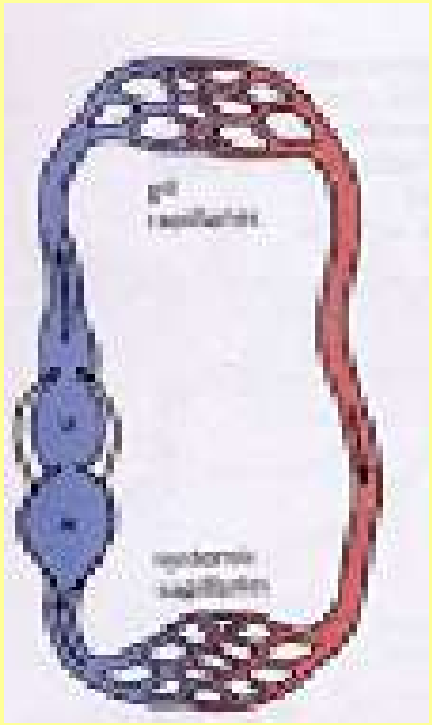
amniotic



This type of reproduction in which a shell is put around the egg and it hatched outside of the mother's body is called **oviparity**



A



B

C

Which diagram shows the type of circulation found in birds?

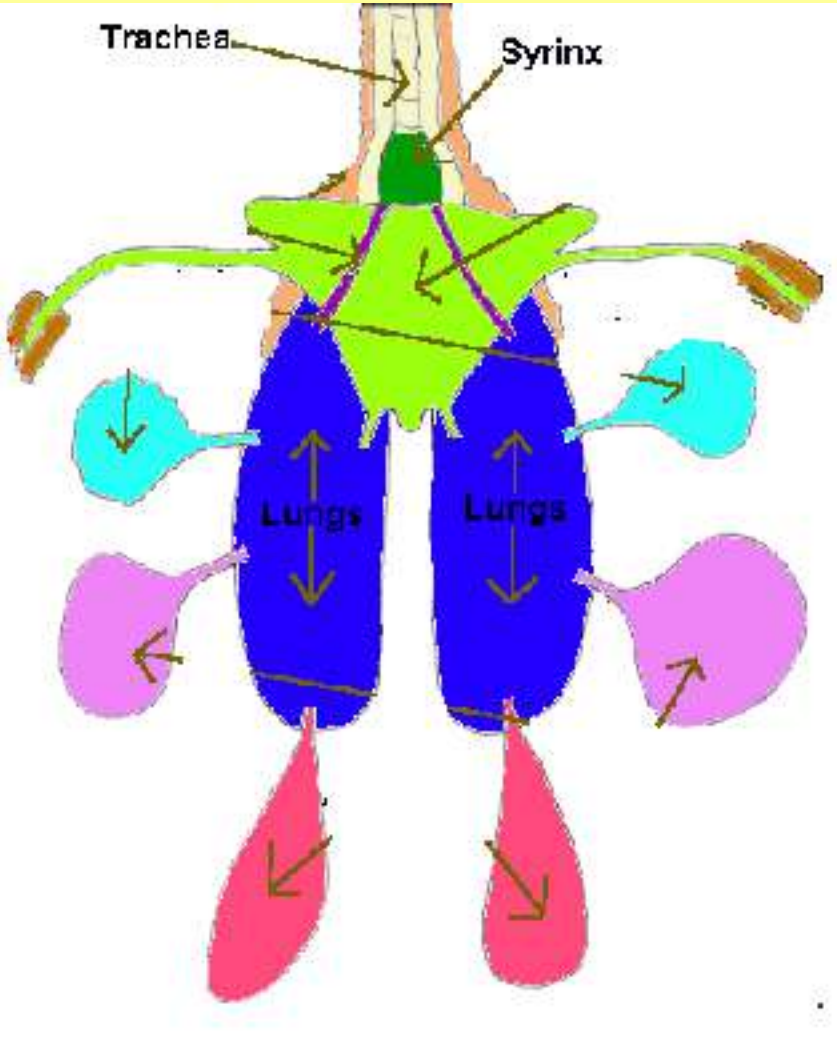
A 4 chambers; 2 loops

Name the two functions of feathers

Lift for flight
Insulation (help hold body heat)

This part of the brain that controls muscle coordination is larger in birds to help with flying.

cerebellum



What is the function of these colored structures attached to the lungs?

Store air to allow oxygenated air in lungs during exhalation

Organ that stores bile

Gall bladder

Makes, stores, and recycles Red blood cells (RBC's)

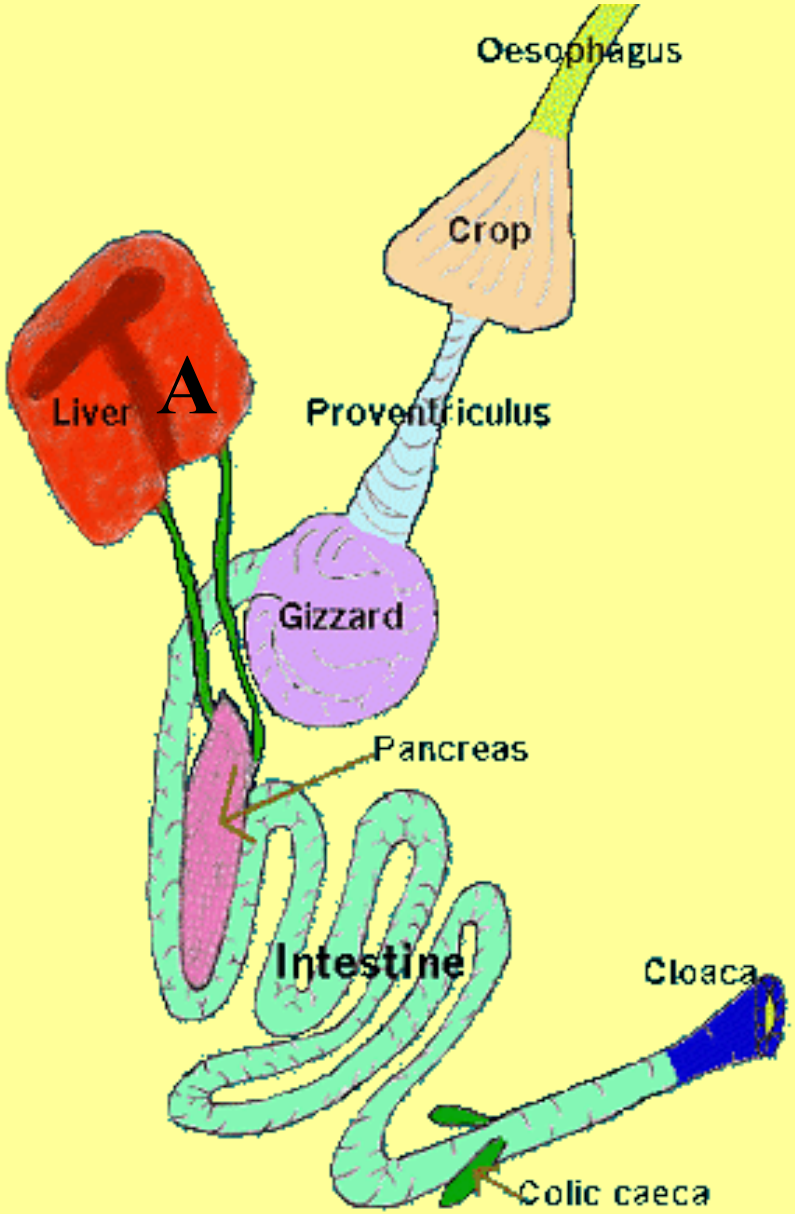
spleen

Organ that contains small rocks to helps smash up food

gizzard

Excretory organ seen in frogs and turtles that is missing in birds

Urinary bladder



What is the function of structure A?

Makes bile

Organ that makes digestive enzymes used in the small intestine

Pancreas make trypsin
Liver makes bile

Fertilization in birds is

INTERNAL EXTERNAL

internal

Organ that makes bile to digest fats

liver

Name one of the parts of the brain that are bigger in birds than in reptiles

Cerebrum
Optic lobes
Cerebellum

Like turtles, birds make nitrogen waste in the form of _____

Uric acid

Protein found in reptile scales and bird feathers

keratin

Match the BIRD body part with its function

Controls autonomic internal organs Medulla oblongata

Opening for air entering respiratory system glottis

Add albumen & shell to eggs oviduct

Carry urine from kidneys to cloaca ureters

Number of chambers in a bird heart

4 (2 atria; 2 ventricles)

Large breastbone to which flight muscles attach

sternum

Pigeons belong to the

Kingdom Animalia

Phylum Chordata

Subphylum Vertebrata

Class Aves

Order Columbiformes

Type of body cavity found in birds

No coelom **pseudocoelom** **eucoelom**

eucoelom

Birds are **Endothermic (warm-blooded)**

EctothermicEndothermic

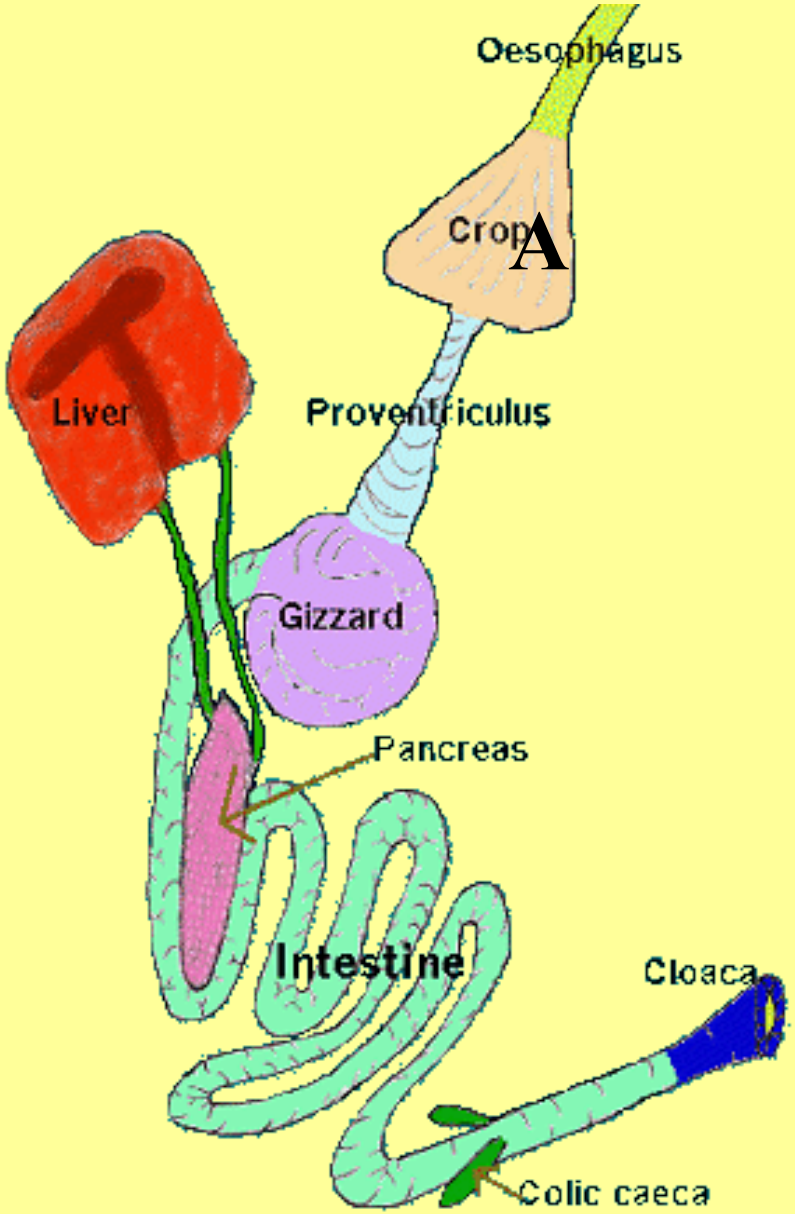
Match the BIRD body part with its function

Connect trachea to lungs bronchi

eardrum tympanic membrane

Part of small intestine where bile & trypsin are added to finish digestion duodenum

Removes uric acid from blood kidneys



What is the function of structure A?

Stores and moistens food waiting to be digested

This is found in the shells of bird eggs to make them hard

Calcium carbonate

TRUE orFALSE
Birds have nictitating membranes like reptiles

True – helps birds that dive under water for food or act as "flight goggles"

Tell how the ENDOCRINE system is modified to help birds fly

1. **THYROID & PANCREAS**
   control fast burning of glucose for energy

2. **ENDOTHERMIC METABOLISM-**
   provides energy for extended activity

Birds are Vertebrate deuterostomes

Invertebrate protostomes
Invertebrate deuterostomes
Vertebrate protostomes
Vertebrate deuterostomes

That means their embryonic blastopore becomes their anus

Contour feathers give birds shape, provide color, and lift for flight.

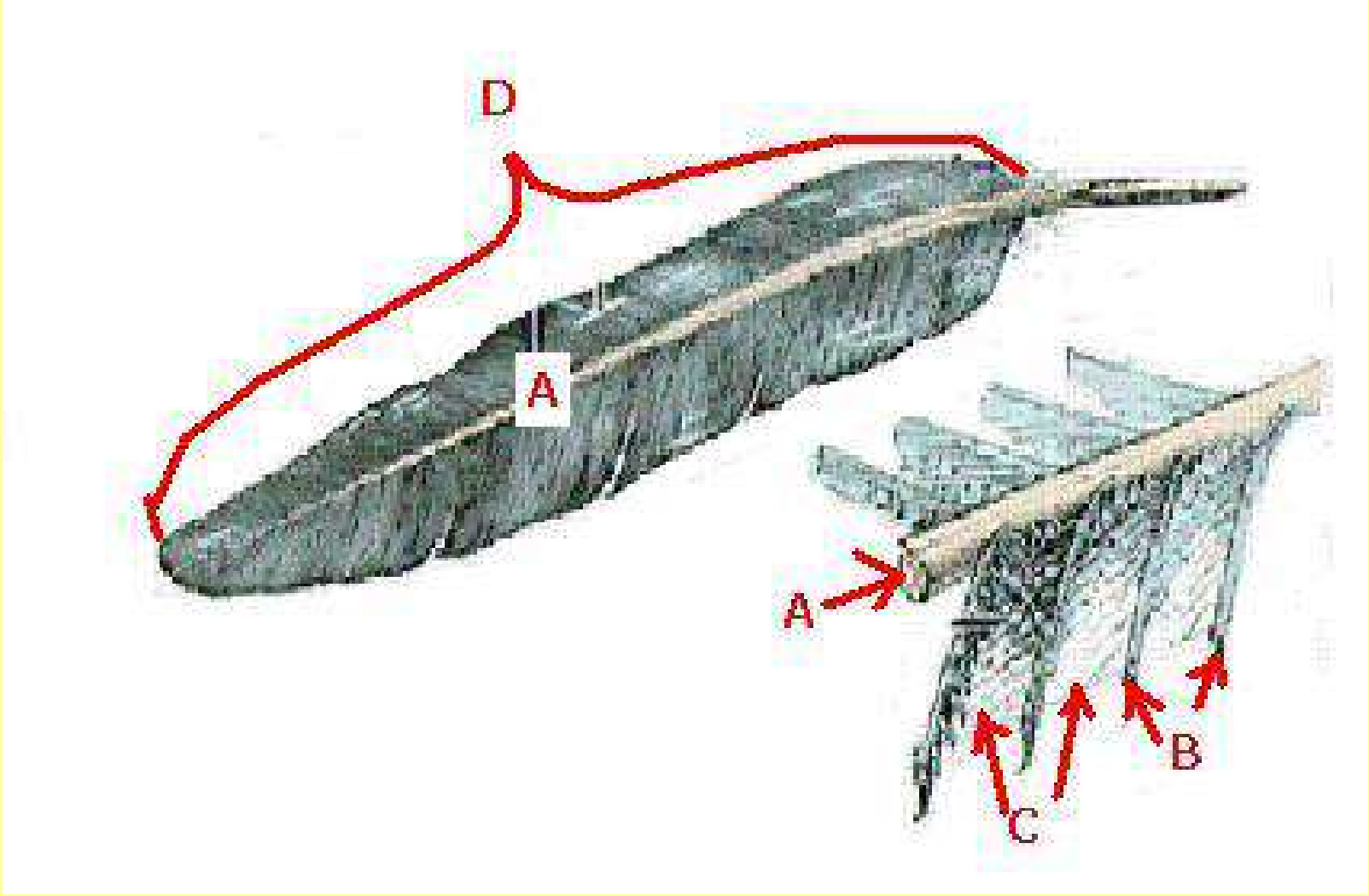
contour down

Birds are endo thermic.

ecto endo

Tell how the CIRCULATORY system is modified to help birds fly

1. **LARGE HEART- for body size pumps more**
2. **2 LOOPS- most efficient/fastest system**
3. **4 chamber heart-**
   total separation of HIGH/LOW oxygen blood
4. **4. FAST HEARTRATE-**
   moves oxygen/nutrients faster



A = ? Rachis

B = ? Barb

C = ? barbule

D = ? vane

Tell 3 cues bird use to navigate

Position of sun/stars; landmarks;
sense Earth's magnetic field;
air pressure changes;
low frequency sound waves

TRUE or FALSE

Birds shed their feathers annually and can regrow lost or damaged feathers.

TRUE

Fertilization in BIRDS is internal

internal external

Name 3 characteristics of BIRDS

- Wings, feathers,
- Light weight/strong skeleton
- 4 chambered heart
- Endothermic (warm blooded)
- Super efficient respiratory system
- Beak
- Oviparity (lay amniotic eggs)

Birds are coelomates

acoelomates **pseudocoelomates** **coelomates**

Number of ovaries in a bird

Only one (on left side)

Tell how the RESPIRATORY system is modified to help birds fly

1. **Super efficient-gets more oxygen out of air**
2. **AIR SACS- allow oxygen on inhale & exhale**
3. **AIR SACS- extend into bones = less dense**
4. **ALVEOLI- increase gas exchange**

Name the substance that does each of the following:

Digest fats bile

Digest proteins trypsin

Made by joining glucose molecules
Used by animals to store energy Glycogen

Tells cells to take glucose from blood
& store it as glycogen insulin

Tells cells to take stored glucose &
release it into the bloodstream glucagon

Match the BIRD body part with its function

Stores & moistens food crop

Oil gland to make feathers waterproof Preen gland

Featherless patch to keep eggs warm Brood patch

Hook barbs together barbules

For higher thinking & learning cerebrum

Tell how the excretory system is modified to help birds fly

1. NO URINARY BLADDER

No storage of urine/ eliminated as made

2. Nitrogen excreted as URIC ACID-

needs less water to dilute

Tell how the REPRODUCTIVE system is modified to help birds fly

1. ONLY ONE OVARY/OVIDUCT on left side
-less weight

2. OVIPARITY-
Eggs laid outside body- less weight

3. OVARY enlarges during breeding season
Shrinks rest of time = less weight

Match the BIRD body part with its function

Stabilizes shoulders during flight furcula

Support for tail pygostyle

Makes trypsin for the small intestine pancreas

Controls muscle coordination cerebellum

Tell how the NERVOUS system is modified to help birds fly

1. **LARGER BRAIN- than reptiles/amphibians**
2. **BIGGER CEREBRUM**

   -for higher thinking, learning, problem solving helps navigation

3. 3. **BIGGER CEREBELLUM-**

   motor coordination/balance

4. **BIGGER OPTIC LOBES-**

   Improved vision- for navigation, finding food

5. **Internal compass stores iron- for navigation**

How is reproduction in birds SIMILAR to reproduction in turtles?

Both : Separate sexes/ with internal fertilization

lay amniotic eggs

have a cloaca

oviduct adds albumen and shell

How is reproduction in birds DIFFERENT than in turtles?

BIRDSTURTLES

only one ovary on left side2 ovaries

Parental carelaid in nest and left

Sex chromosomesno sex chromosomes

(sex determined by temp)

Calcium makes shell hardtough leathery shell

Match the BIRD body part with its function

Fleshy area near beak cere

3rd eyelid Nictitating membrane

Part of small intestine where nutrients are absorbed ileum

Removes uric acid from blood kidneys

Attachment for flight muscles sternum

How is the excretory system in birds SIMILAR to the excretory system in turtles?

Both : have 2 kidneys

excrete nitrogen waste as uric acid

exit through cloaca

How is the excretory system in birds DIFFERENT than in turtles?

BIRDSTURTLES

No urinary bladderUrinary bladder stores urine

Match the BIRD body part with its function

Carry eggs from ovary to cloaca ___oviduct___

Carry sperm from testes to cloaca ___Vas deferens___

Largest Vein returning to heart _____ **Vena cava**

Largest artery leaving heart ___Aorta___

How is the circulatory system in birds SIMILAR to that seen in turtles?

Both : closed circulation
septum (partial or full)
- **No conus arteriosus or sinus venosus**
- **2 loops**
- **red blood cells have nuclei**

How is circulatory system in birds DIFFERENT than in turtles?

BIRDSTURTLES

4 chamber heart3 chamber heart

Tell something that is new about birds that you haven't seen in any other animal you dissected.

They are ENDOTHERMIC
(warm blooded)

4 chamber heart

Feathers

Hollow bones

Fused bones: furcula, pygostyle

Syrinx

Air sacs

No urinary bladder

THE END