Biology 2

lab Packet

for

Practical 4

Birds
CLASSIFICATION:
Domain: Eukarya
Kingdom: Animalia
Phylum: Chordata – Chordates
Class: Aves – Birds

Order: Struthioniformes – Ostriches
Order: Rheiformes – Rheas
Order: Casuariiformes – Cassowaries
Order: Apterygiformes – Kiwis
Order: Sphenisciformes – Penguins
Order: Gaviiformes – Loons
Order: Podicipediformes – Grebes
Order: Procellariiformes – Tube noses
Order: Pelicaniformes – Pelicans
Order: Ciconiiformes – Herons/Egrets
Order: Phoenicopteriformes – Flamingos
Order: Anseriformes – Ducks
Order: Falconiformes – Raptors

Order: Galliformes – Quail
Order: Gruiformes – Coots
Order: Charadriiformes – Gulls and Allies
Order: Columbiformes – Pigeons
Order: Psittaciformes – Parrots
Order: Cuculiformes – Roadrunners
Order: Strigiformes – Owls
Order: Caprimulgiformes – Nighthawks
Order: Apodiformes – Hummingbirds
Order: Trogoniformes – Trogons
Order: Coraciformes – Kingfishers
Order: Piciformes – Woodpeckers
Order: Passeriformes – Songbirds

Introduction – Birds

Although chordates vary widely in appearance, they are distinguished as a phylum by the presence of four anatomical features that appear sometime during their lifetime. They exhibit deuterostome development and bilateral symmetry. Chordates only comprise 5% of the animal species but may be the most commonly known phylum. Birds are endothermic homeotherms which have adapted to many different ecosystems in the world.

Station 1 – Class: Aves

1. What three adaptations do birds have for flight?

2. What do all species of birds have?

3. What dinosaurs did birds emerge within? When did they show up?

4. Where are birds found?
Station 2 – Evolutionary History - *Archaeopteryx*

1. What characteristics are seen in *Archaeopteryx* that are bird-like?

2. What characteristics are seen in *Archaeopteryx* that are reptile-like?

Station 3 – General Characteristics - Feathers

1. What are feathers made of?

2. Be able to recognize the six types of feathers and know their functions. Also be able to recognize the feathers in the display.
Station 4 – General Characteristics - Color

1. What causes the different colors we see in bird’s today?

2. What are the different types of plumage mentioned and what is their function?

3. Know what produces the following colors in the following birds.
   - Red in Northern Cardinals:
   - Pink in Flamingo’s:
   - Blue in Western Scrub-Jays
   - Yellow in the American Goldfinch
   - Iridescent colors in the Anna’s Hummingbird

Station 5 – General Characteristics - Bones and Muscles

1. What are the three regions in birds where bones are fused together and what are each of them called?

2. What is the muscle in birds which lifts their wings? What is the muscle that is used to lower the wings?

3. How much of a bird’s body mass is accounted for by the flight muscles?

4. Do birds have teeth? Why or why not?
Station 6 – General Characteristics – Bipedalism and Feet

1. Although most tetrapods are quadrupeds, what is the term used for birds?

2. The part of a bird’s leg that looks like a “backwards” knee is actually what part?

3. What is the name of the type of foot seen on the left below?

4. What is the name of the type of foot seen on the right?

![Foot Diagrams]

Station 7 – General Characteristics – Metabolism

1. What type of metabolic rate do birds have?

2. What is the normal range of body temperatures?

3. What zones are birds usually larger? Why?

4. What two functions does the respiratory system play?

5. What respiratory structures do birds have?

6. What do air sacs permit?
Station 8 – General Characteristics - Reproduction

1. Other vertebrates lay eggs, but bird egg laying is unique among vertebrates. Why?

2. What is the largest egg?

3. What is the smallest egg?

Station 9 – Reproductive Behavior – Monogamy

1. What is meant by Socially Monogamous?

2. What are Extra-pair copulations?

3. How many species of birds are considered Socially Monogamous?

Station 10 – Reproductive Behavior – Red-winged Blackbirds

1. What is polygyny?

2. What conditions favor this condition?

Station 11 – Reproductive Behavior – Sage Grouse

1. What is Lekking? What is the name of the area used for display?

2. What are the benefits of Lekking?
Station 12 – Reproductive Behavior – Northern Jacana

1. What is polyandry?

2. Using this type of reproductive behavior, what happens to the sexual roles in these birds?

3. What is the evolutionary reason for polyandry?

Station 13 – Reproductive Behavior – Acorn Woodpecker

1. What is polygyandry?

2. Why do Acorn woodpeckers primarily live in groups?

3. What is special about the way they nest?

Station 14 – Reproductive Behavior – Brown-headed Cowbirds

1. What is brood parasitism?

2. How many species do they parasitize?

3. What is the cost to the host species?

Station 15 – Reproductive Behavior – Phainopepla

1. What is this bird's typical diet?

2. What is unique about this bird's nesting behavior?

3. How do they behave in the desert environment?

4. How do they behave in the woodland area?
### Station 16 – Feeding Behavior – Adaptations

<table>
<thead>
<tr>
<th>Bird Skull</th>
<th>Adaptation</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Ostrich</td>
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<tr>
<td>Brown Kiwi</td>
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<td></td>
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<tr>
<td>Indian Yellow-nosed Albatross</td>
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<td>Great Blue Heron</td>
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<tr>
<td>Scarlet Ibis</td>
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<tr>
<td>Roseate Spoonbill</td>
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<tr>
<td>Caribbean Flamingo</td>
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<tr>
<td>Duck</td>
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<tr>
<td>Harpy Eagle</td>
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<tr>
<td>Peregrine Falcon</td>
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<tr>
<td>Turkey Vulture</td>
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</tbody>
</table>
### California Condor

### Common Snipe

### King Penguin

### Black Hornbill

### Toco Toucan

### Scarlet Macaw

### Owl

### Pileated Woodpecker

### Wren

### Station 17 – Resource Partitioning

1. What is resource portioning?

2. How does an American Avocet’s bill differ from a Black legged Stilt?
Station 18 – Ducks (Dabblers vs. Divers)

1. What is a dabbler? What is a diver?

2. How do the legs differ between these two different types of duck?

3. Know the Northern Pintail and Northern Shoveler which are dabblers and the Hooded Merganser is a diving duck.

Station 19 – Birds of Prey - Loggerhead Shrikes

1. Why are they considered a bird of prey?

2. How do they kill their food?

3. What is their nickname?

Station 20 – Birds of Prey - Hawks and Falcons

1. What is the common diet for a Red-tailed Hawk?

2. What is the Peregrine Falcon known for? What do they eat?

3. What is a Kestrel? What do they eat? What is “unique” about their flight pattern?

Station 21 – Birds of Prey - Owls

1. Why are owls thought to be nocturnal?

2. How far can Owl’s turn their head? Why can they do this? Why is it necessary?

3. Which species of Owl is diurnal? How do the young protect themselves in the nest?

4. Know the difference between the Barn Owl and the Great Horned Owl.
Station 22 – Avoiding Predators- Killdeer

1. Where do these birds lay their eggs?

2. How do the adults protect their young?

Station 23 – Introduced Species

1. Why were Starling introduced to the United States? What problems are they causing?

2. What is one of the more common introduced species in our area? What was their original name?

Station 24 – Communication

1. How do birds communicate?

2. What do songs consist of? How does a song of a cardinal differ from that of a mockingbird?

3. How do birds produce these sounds? Why do mourning doves making only cooing noises?

4. What is a call? How do bushtits use these?

5. How do you recognize the call of a Wrentit?

6. What separates the Western Meadowlark species from the Eastern Meadowlark?
**Station 25 – Bird Songs**

Be able to recognize the songs from the following birds.

1. Barn Owl

2. Great Horned Owl

3. California Quail

4. Red-Shouldered Hawk

5. Red-Tailed Hawk

6. Cactus Wren

7. Bushtit

8. Wren Tit

9. Mocking Bird

10. Mourning Dove

11. Acorn Woodpecker

12. Belted Kingfisher

13. Killdeer

14. American Kestrel

15. Red-winged Blackbird
Station 26 - Bird Migration

1. What are the four groups birds can be placed in?

2. Why do birds migrate?

3. What are the four “flyways” in North America?

Station 27 – Desert Adaptations – Roadrunners

1. What is torpor? Why do roadrunners do this?

2. What adaptation do Roadrunners have to help them use less energy “waking up” from torpor?

Station 28 – Desert Adaptations - Cactus Wrens

1. How did these birds get their name?

2. Why do these birds make multiple nests?

Station 29 – Desert Adaptations – Gambel’s Quail

1. What is their typical body temperature? What can they do to this temperature to reduce water loss?

2. How much body weight can they lose in water?
Station 30 – Other Behaviors – Penguins and Alcids

1. Where are penguins found? Where are Murrelets and Auklets found?

2. What do they have in common? How are they different?

Station 31 – Other Behaviors - Hummingbirds and Swallows

1. What does the order these birds are in mean?

2. What do hummingbirds eat?

3. Be able to identify the hummingbirds at this station.

4. What do swallows eat?

5. What types of nest do they make?

6. Be able to identify the swallows at this station
**Station 32 – Other Behaviors – Common Birds**

Be able to recognize the following birds in your neighborhoods

<table>
<thead>
<tr>
<th>Bird</th>
<th>Location</th>
<th>Food</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Robin</td>
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<tr>
<td>Brewer’s Blackbird</td>
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<tr>
<td>Black Phoebe</td>
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<td></td>
<td></td>
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<tr>
<td>California Gnatcatcher</td>
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<tr>
<td>California Thrasher</td>
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<tr>
<td>California Towhee</td>
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<tr>
<td>Crow</td>
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<td></td>
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<tr>
<td>House Finch</td>
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<td></td>
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<tr>
<td>Northern Oriole</td>
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<td></td>
<td></td>
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<tr>
<td>Plain Titmouse</td>
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<td></td>
<td></td>
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<tr>
<td>Spotted Towhee</td>
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<td></td>
<td></td>
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<tr>
<td>Western Bluebird</td>
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<tr>
<td>Western Kingbird</td>
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<td></td>
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<tr>
<td>Yellow-rumped Warbler</td>
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</tbody>
</table>
## Station 33– Bird Orders

Be able to identify the examples of each of the bird orders.

<table>
<thead>
<tr>
<th>Order</th>
<th>Description</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order: Pelicaniformes</td>
<td>Pelicans – Four webbed toes, long beak with throat pouch</td>
<td></td>
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<tr>
<td>Order: Coraciformes</td>
<td>Kingfishers – Strong prominent bill, colorful feathers</td>
<td></td>
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<tr>
<td>Order: Apodiformes</td>
<td>Hummingbirds – Small birds with short legs, small feet, with long, slender beaks</td>
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<tr>
<td>Order: Columbiformes</td>
<td>Pigeons, Doves – Slender bill with soft skin at base, short neck</td>
<td></td>
</tr>
<tr>
<td>Order: Falconiformes</td>
<td>Raptors – Birds of Prey</td>
<td></td>
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<tr>
<td>Order: Anseriformes</td>
<td>Ducks – Broadened bills, short legs with webbed feet</td>
<td></td>
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<tr>
<td>Order: Galliformes</td>
<td>Quail – Hen-like birds with short beaks</td>
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<tr>
<td>Order: Gruiformes</td>
<td>Coots – Smaller birds with short beaks</td>
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<tr>
<td>Order: Charadriiformes</td>
<td>Shorebirds</td>
<td></td>
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<tr>
<td>Order: Psittaciformes</td>
<td>Narrow hooked beak with brilliant plumage</td>
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<tr>
<td>Order: Cuculiformes</td>
<td>Greater Roadrunner – Varied, local bird with long legs and tail</td>
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<tr>
<td>Order: Strigiformes</td>
<td>Owls - Nocturnal birds of Prey</td>
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<tr>
<td>Order: Piciformes</td>
<td>Woodpeckers – Thick bill for drilling holes</td>
<td></td>
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<tr>
<td>Order: Casuariiformes</td>
<td>Cassowaries - Flightless Walking Bird (3 toes)</td>
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<tr>
<td>Order: Struthioniformes</td>
<td>Ostriches - Flightless Walking Bird (2 toes)</td>
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<tr>
<td>Order: Rheiformes</td>
<td>Rheas - Flightless Walking Bird (3 toes)</td>
<td></td>
</tr>
<tr>
<td>Order: Apterygiformes</td>
<td>Kiwis - Small flightless bird</td>
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<tr>
<td>Order: Tinamiformes</td>
<td>Tinamous - Poor flying birds</td>
<td></td>
</tr>
<tr>
<td>Order: Sphenisciformes</td>
<td>Penguins – Web footed, short winged, marine birds</td>
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<tr>
<td>Order: Troganiformes</td>
<td>Trogons – Brightly colored, long tailed tropical birds</td>
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<tr>
<td>Order: Gaviiformes</td>
<td>Loons – Heavy bodied, diving birds</td>
<td></td>
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<tr>
<td>Order: Podicipediformes</td>
<td>Grebes – Short legged divers with lobed feet</td>
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<tr>
<td>Order: Procellariiformes</td>
<td>Tubenoses – Marine birds with tubular nostrils on beack</td>
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<tr>
<td>Order: Ciconiiformes</td>
<td>Waders – Long-necked, long legged waders</td>
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<tr>
<td>Order: Caprimulgiformes</td>
<td>Nighthawks – Night fliers</td>
<td></td>
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<tr>
<td>Order: Passeriformes</td>
<td>Songbirds – very variable</td>
<td></td>
</tr>
</tbody>
</table>
Station 34 - CLASS: AVES – INTERNAL FEATURES (P 206, Figs. 8.42 – 8.43)

<table>
<thead>
<tr>
<th>System</th>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive System</td>
<td>Esophagus&lt;br&gt;Crop&lt;br&gt;Proventriculus&lt;br&gt;Gizzard&lt;br&gt;Intestine&lt;br&gt;Liver&lt;br&gt;Pancreas&lt;br&gt;Cloaca</td>
<td></td>
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<tr>
<td>Excretory System</td>
<td>Kidneys</td>
<td></td>
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<tr>
<td>Circulatory System</td>
<td>Atria (2)&lt;br&gt;Ventricle (2)</td>
<td>Double Circuit system (whole system)&lt;br&gt;Compare to Mammal (Why the difference is size?)</td>
</tr>
<tr>
<td>Respiratory System</td>
<td>Lungs&lt;br&gt;Air Sacs</td>
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<tr>
<td>Reproductive System</td>
<td>Ovaries or Testes</td>
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</tbody>
</table>

![Bird Internal Diagram](image-url)
**Station 36 – VERTEBRATE HEART SERIES**  
Be able to recognize the listed structures.

a) Fish Heart (sinus venosus, atrium, ventricle, bulbus arteriosus, truncus arteriosus)

b) Amphibian Heart (sinus venosus, right atrium, left atrium, ventricle, conus arteriosus, truncus arteriosus, pulmo-cutaneous artery, aorta)

c) Turtle Heart (sinus venosus, right and left superior vena cavas, inferior vena cavas, right atrium, left atrium, ventricle, pulmonary veins, aorta)

d) Crocodile Heart (right and left superior vena cavas, inferior vena cava, right atrium, left atrium, right ventricle, left ventricle, pulmonary veins, aorta)

e) Bird Heart (right and left superior vena cavas, inferior vena cava, right atrium, left atrium, right ventricle, pulmonary arteries, aorta)

f) Mammal Heart (superior vena cava, inferior vena cava, right atrium, left atrium, right ventricle, pulmonary arteries, aorta)

**Station 37 – VERTEBRATE BRAIN SERIES**  
Be able to recognize the listed structures and their functions

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medulla Oblongata</td>
<td></td>
</tr>
<tr>
<td>Pons</td>
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<tr>
<td>Mesencephalon (midbrain)</td>
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<tr>
<td>Cerebellum</td>
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<td>Optic Lobe</td>
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<tr>
<td>Olfactory Lobe</td>
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<tr>
<td>Cerebrum</td>
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</tbody>
</table>
10.49 Evolutionary change in relative size of midbrain and forebrain in vertebrates