Biology 452
Lab Practical 1 - Summer 2009

Station 1

A. Red-winged Blackbird (Female)
B. House Finch (Female)
C. White-crowned Sparrow
D. Northern Oriole (Female)
E. Song Sparrow

1. What technical term best describes the bill shape of Specimen B? **Conical**
2. What is the complete common name of Specimen E? **Song Sparrow**
3. List the letter(s) of the specimen(s) that are frugivores. **D**
4. What technical term describes the foot type of this group? **Anisodactyl**

Station 2

A. Northern Harrier
B. Sharp-shinned Hawk
C. Red Tailed Hawk
D. Common Nighthawk
E. American Kestrel (Male)

5. What is the complete common name of Specimen A? **Northern Harrier**
6. How many Orders are featured in this group of birds? **2**
7. List the letter(s) of the specimen(s) that feature(s) a tooth on the bill. **E**
8. What is the technical term that best describes the foot of Specimen C? **Raptorial**

Station 3

A. Steller's Jay
B. Belted Kingfisher (Male)
C. Red-breasted Nuthatch
D. Downy Woodpecker (Female)
E. Northern Flicker (Male)

9. List the letter(s) of the specimen(s) that COULD be &/or ARE female. **A, C, D**
10. How many Orders are represented in this group? **3**
11. List the letter(s) of the specimen(s) that has/have zygodactyl feet. **D, E**
12. List the letter(s) of the specimen(s) that has/have a vertebrate diet. **B**

Station 4

A. Black-headed Grosbeak (Female)
B. Cedar Waxwing
C. Northern Shrike
D. Spotted Towhee (Female)
E. American Robin (Female)

13. What technical term best describes the tail shape of Specimen B? **Square**
14. What is the complete common name of Specimen D? **Spotted Towhee**
15. List the letter(s) of the specimen(s) that has/have a vertebrate diet. **C**
16. List the letter(s) of the specimen(s) that has/have a frugivorous diet. **A, B & E**

Station 5

A. Killdeer
B. Rufous Hummingbird (Male)
C. California Quail (Female)
D. White-throated Swift
E. Violet-green Swallow

17. List the letter(s) of the specimen(s) that is/are in the Order Apodiformes. **B and D**
18. List the letter(s) of the specimen(s) that has/have an aerial foraging mode. **B, D, E**
19. What is the complete common name of Specimen E? **Violet-green Swallow**
20. What is the diet of Specimen B? **Nectarivore**

Station 6

A. Black-headed Grosbeak (Male)
B. Yellow-headed Blackbird (Male)
C. American Robin (Male)
D. Spotted Towhee (Male)
E. Red-winged Blackbird (Male)

21. What is the complete common name of Specimen A? **Black-headed Grosbeak**
22. List the letter(s) of the specimen(s) that is/are male. **A, B, C, D, E**
23. List the letter(s) of the specimen(s) that is/are granivores. **B, D, E**
24. What is the Order to which all of these specimens belong? **Passeriformes**

Station 7

A. Barn Swallow
B. Marsh Wren
C. Black-capped Chickadee
D. Bush tit
E. American Goldfinch (female)

25. What technical term best describes the tail of Specimen A? **Forked**
26. What is the complete common name of Specimen B? **Marsh Wren**
27. List the letter(s) of the specimen(s) that is/are foliage-bark gleaners. **B, C & D**
28. How many Orders are represented in this group? **1**

Station 8

A. American Goldfinch (Male)
B. Western Kingbird
C. Northern Oriole (Male)
D. Mourning Dove

29. What is the Order of specimen D? **Columbiformes**
30. What is the complete common name of Specimen B? **Western Kingbird**
31. List the letter(s) of the specimen(s) that is/are ground-gleaners. **A, D**
32. List the foraging mode of Specimen B. **Aerial**

Station 9

Cattle Egret

33. Using the key below identify the correct steps to arrive at an order for this specimen. **1B, 5B, 7A, 8A, 9A**
34. List the letter of the order from the key below, that this specimen belongs to. **Order G**

1A	Feet fully webbed (extends between adjacent toes)	2
1B	Partial webbing on toes, or none	5
2A	Totipalmate; all toes large	**Order A**
2B	Palmate, front 3 toes webbed; 4th toe very small, if present	3
3A	Tarsus flattened, feet very far back on body	**Order B**
3B	Tarsus not flattened, feet not as far back	4
4A	Narrow bill with a toothed or saw-like edge & hooked tip or flattened with a nail at tip	**Order C**
4B	Bill is sharply hooked, or straight & sharply pointed	**Order D**
5A	Webbing present on individual toes, not between toes	6
5B	Semi-palmate; or no webbing	7
6A	Tarsus flattened; short legs; single lobe on each toe	**Order E**
6B	Tarsus not flat; longer legs; toes are multilobed or scalloped	**Order F**
7A	Legs long relative to body size; toes long & slender	8
7B	Legs shorter relative to body size; toes not long & slender	11
8A	Bill long, very stout & horny; bare patch of skin in front of eyes	9
8B	Bill short or long, tapered to a sharp point	10
9A	Middle toe pectinate	**Order G**
9B	Middle toe not pectinate; entire forehead is bare	**Order H**
10A	Bill long & slender, may be straight, recurved or decurved	**Order I**
10B	Bill taller at base than at tip, shorter, stout	**Order J**
11A	Raptorial feet	12
11B	No raptorial feet	13
12A	Naked cere; tarsus usually bare	**Order K**
12B	Cere hidden in feathers; tarsus & toes feathered	**Order L**
13A	Feet chicken-like; claws strong & blunt	14
13B	Feet not chicken-like but may be strong or weak; variously modified	15
14A	Bill conical, decurved & feathered to the nostrils	**Order M**
14B	Bill strongly hooked; head & neck bare of feathers	**Order N**
15A	Feet small & weak relative to body size	16
15B	Feet medium-sized to large relative to body size	19
16A	Outer 2 toes fused along half their length (syndactyl)	**Order O**
16B	Outer 2 toes not syndactyl	17
17A	Nostrils open in soft, swollen cere	**Order P**
17B	Nostrils not as above; feet extremely tiny	18
18A	Extremely small body	**Order Q**
18B	Medium sized body; 3rd toe pectinate; greatly enlarged eyes	**Order R**
19A	Zygodactyl feet	**Order S**
19B	Anisodactyl feet	**Order T**

Station 10

A. American Kestrel (Female)
B. California Quail (Male)
C. Great Horned Owl
D. Ring-necked Pheasant (Female)
E. Burrowing Owl

35. How many Orders are represented in this group? **3**
36. What technical term best describes the foot of specimen B? **Semipalmate**
37. What is the complete common name of Specimen D? **Ring-necked Pheasant**
38. Which specimen(s) is/are nocturnal? **C and E**

Station 11

A. Greater Yellowlegs
B. Western Sandpiper
C. Glaucous-winged Gull
D. Caspian Tern

39. What is the complete common name of Specimen C? **Glaucous-winged Gull**
40. List the letter(s) of the specimen(s) that belong to the Order Charadriiformes. **A, B, C, D**
41. List the letter(s) of the specimen(s) that has/have a vertebrate diet. **C, D**
42. List the letter(s) of the specimen(s) that use the probe-strike foraging method. **A, B**

Station 12

A. Double-crested Cormorant
B. Pied-bill Grebe
C. Great Blue Heron
D. Northern Shoveler
E. Coot

43. List the letter(s) of the specimen(s) that is/are in the Order Pelecaniformes. **A**
44. List the letter(s) of the specimen(s) that has/have totipalmate feet. **A**
45. What is the complete common name of Specimen B? **Pied-bill Grebe**
46. What technical term describes the bill shape of Specimen D? **Spatulate**

Station 13

A. Mallard
B. Wood Duck
C. Redhead
D. Hooded Merganser

47. What is the complete common name of Specimen C? **Redhead**
48. List the letter(s) of the specimen(s) that has/have a speculum. **A, B**
49. What technical term best describes the bill of Specimen D? **Serrate**
50. List the letter(s) of the specimen(s) that is/are surface divers. **C and D**

Station 13:

P. Townsend Mole skull
Q. (Myotis) bat skull
R. American Pika skull
S. Jumping mouse skull

51. How many orders are represented at this station? **4**
52. How many foraging locations are represented at this station? **3**
53. What is the complete common name of R? **American Pika**
54. What is the order that Q belongs to? **Chiroptera**

Station 15:

U. Douglas Squirrel skull
W. Cascade Golden-mantled Ground Squirrel
X. Yellow-Pine Chipmunk
Y. Douglas squirrel

55. What order do all of these specimens belong to? **Rodentia**
56. Give the complete common name of Specimen W. **Cascade Golden-mantled Ground Squirrel**
57. List the letter of the skin that matches the skull. **Y**
58. State the diet AND foraging strategy of specimen X. **Omnivore, arboreal**

Station 16:

A. Townsend's Vole
B. American Shrew Mole
C. Pacific shrew
D. Vagrant Shrew
E. Northern Grasshopper Mouse

59. Give the names of the order(s) represented here. **Rodentia, Soricomorpha**
60. What is the diet of specimen C? **Vertebrates/ invertebrates.**
61. Which organisms share the same foraging strategy? **A, D, E**
62. Give the complete common name for specimen E. **Northern Grasshopper Mouse**

Station 17:

F. Big Brown Bat
G. Little Brown Bat
H. Hoary Bat
I. Pallid Bat

63. Which organism eats vertebrates AND invertebrates (give the letter)? **I**
64. Give the full common name of specimen F. **Big Brown Bat**
65. What order do these specimens belong to? **Chiroptera**
66. What is the foraging strategy shared by these specimens? **Aerial**

Station 18:

J. Striped Skunk Skull
K. Raccoon Skull
L. Bear skull
M. Bobcat skull
O. Wolf Skull (teeth labeled with numbers 1-8)

67. What is the dental formula of specimen J? **3/3; 1/1; 3/3; 1/2**
68. Which of the skulls (J-M) are from carnivorous animals (i.e. diet = vertebrates only)? **M**
69. List the letter of the tooth on skull O's lower jaw that is the carnassial. **6**

Station 19:

P. Elk Antler
Q. Moose skull (w/out antlers)
R. Elk skull (X - points to anteorbital pit)
S. Pronghorn skull
T. Mountain goat skull
U. Deer Skull

70. List the letter of the skull that matches the antler (P). **R**
71. List the letter(s) of the specimen(s) that has/have "true horns" **T**
72. How many total (not just one side of the skull) lacrimal foramina does skull S have? **4**
73. What is the feature labeled X on skull R? **Anteorbital pit**

Station 20:

U. Snowshoe Hare skull
V. Bushy-tailed Woodrat
W. Northern Pocket Gopher skull
X. Pacific Jumping Mouse skin
Y. Northern Pocket Gopher skin
Z. Great Basin Pocket Mouse skin

74. List the letter of the skin that matches skull W. **Y**
75. What order does specimen U belong to? **Lagomorpha**
76. List the letter(s) of the specimen(s) that is/ are NOT omnivorous. **U, Z**
77. List the complete common name of X. **Pacific Jumping Mouse**

Station 21:

A. Human skull
B. Pig skull
C. Red Fox skull
D. Kangaroo rat skull
E. Harbor Seal skull

78. List the letter(s) of the specimen(s) that are omnivores. **A, B**
79. List the letter(s) of the specimen(s) that would have digitigrade posture. **C**
80. Give the complete common name of E. **Harbor Seal**
81. List the letter(s) of the specimen(s) from the order Carnivora. **C, E**

Station 22:

D. Walrus skull
E. Coyote skull
F. Horse skull
G. Pig skull

82. List the letter(s) of the skulls with bunodont shaped cusps on the cheek teeth. **G**
83. List the letter(s) of the skull(s) with hypsodont crown height in their cheek teeth. **F**
84. Which of these specimens has the largest incisors? **F**
85. Which of these specimens has the largest canines? **D**

Station 23:

H. Porpoise skull

86. Using the key below identify the correct steps to arrive at an order for specimen H. **1b, 2a, 3a, 4a.**
87. What is the letter of the order from the key below that this specimen belongs to? **Order C**

Station 24:

I. Wolverine skull

88. Using the key below identify the correct steps to arrive at an order for specimen I. **1b, 2b, 5a, 6b, 8b, 9b, 10b.**
89. What is the letter of the order from the key below that this specimen belongs to? **Order K**

1A	Teeth absent, rows of baleen in palate instead of teeth	**Order A**
1B	Teeth present; no baleen	**2**
2A	Teeth homodont, not differentiated (not even enlarged canines)	**3**
2B	Teeth heterodont (differentiated into 2 or more types)	**5**
3A	Nasal bones telescoped posteriorly; external nares directed vertically upward	**4**
3B	Nasal bones in normal position over top of rostrum; external nares at tip of rostrum & directed forward	**Order B**
4A	Teeth few or many; teeth usually conical & extend to tip of jaw	**Order C**
4B	Teeth numerous but rarely > 6 in either jaw at 1 time, squarish in shape	**Order D**
5A	No conspicuous gap between the teeth in the front & back of the jaws	**6**
5B	Wide diastema present between the teeth in the front & back of jaws	**Order F**
6A	Canine teeth not larger than any of the teeth preceding them	**7**
6B	Canine teeth much larger and longer than any of the preceding teeth	**8**
7A	Teeth pigmented; zygomatic arch absent; tympanum ring like, no tympanic bulla	**Order G-1**
7B	Teeth unpigmented; zygomatic arch present; tympanic bulla present.	**Order G -2**
8A	Incisors 5/4, 50 teeth total	**Order H**
8B	Incisors never more than 3/3, teeth never exceeding 44 total	**9**
9A	Canine teeth triangular in cross-section; occipital& sagittal crests form a high T-shaped ridge; jaw teeth bunodont	**Order I**
9B	Canine teeth round, oval or laterally compressed; occipital crests less prominent & not as T-shaped; jaw teeth various	**10**
10A	Cheek teeth usually with high-pointed cusps that are united to form a W-shape; incisors never > 2 above	**Order J**
10B	Cheek teeth shearing, grasping or grinding, never with sharp W-shaped cusps; incisors 1-3 above	**Order K**

Station 25:

J. Bobcat skin
K. Northern Fur Seal skin
L. brown Long-tailed Weasel skin
M. American Mink skin

90. What is the complete common name of specimen J? **Bobcat**
91. If you wanted to make a fur coat that was waterproof, which skin (list its letter) would be the best choice based on what you know of their foraging strategies? **K**
92. How many orders are represented at this station? **1**
93. List the letter(s) of the specimen(s) that turn white during winter. **L**

Station 26:

N. Mountain Beaver skull
O. American Beaver skull
P. North American Porcupine skull
R. Muskrat skull

94. List the letter(s) of the specimen(s) that has/have ever growing incisors? **N, O, P, R (all)**
95. What term best describes the cusp pattern on cheek teeth of specimen R? **Prismatic**
96. Give the complete common name of the specimen with the largest infra-orbital canals (IOC). **North American Porcupine**.
97. List the letter of the specimen that you are most likely to see in a tree. **P**

Station 27:

Labeled Cougar skull

A. coronoid process
B. condyloid process
C. angular process
D. maxilla
E. nasals
F. Poop
G. Zygomatic arch
H. Occipital/Lamdoidal crest
I. Auditory bulla

98. What letter indicates the postorbital process (PooP)? **F**
99. What letter indicates the condyloid process? **B**
100. What letter indicates the auditory bulla? **I**

BONUS QUESTIONS

"Double-pulley" astragalus

BONUS A. Name 1 of the Orders of Mammals that has this type of ankle bone & then name this specific bone.

Cetacea, OR Artiodactyla 1 pt. & astragalus or double-pulley 1 pt (1/2 pt for tarsal)

J. Evening Grosbeak skull
K. Chicken skull
L. Owl skull
M. Tern skull
N. Albatross skull
O. Pelican skull

Bonus B. List the letter of the specimen that is the most primitive member of the Neognathae birds within this group (J-O): **K**

Marsh wren nest

BONUS C. Give the complete common name of the bird that builds this type of nest.

Marsh Wren

P. Nutria skull
Q. Kangaroo skull
R. Sloth skull
S. Monkey skull
T. Armadillo skull
U. Lion skull

BONUS D. List the letter(s) of the skulls (P-U) that are members of the clade Xenarthra:

R, T