

GENERAL ZOOLOGY (BIOLOGY 120): COURSE SYLLABUS

Instructor: Dr. Tupper

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Office hours TBD. I'm very flexible during the week and will be available daily.



COURSE DESCRIPTION AND GENERAL PURPOSE: Presents basic biological principles, emphasizes structure, physiology, and evolutionary relationships of invertebrates and vertebrates. This is a four-credit, one-semester course for science majors, or nonmajors. In it, students are introduced to the evolution of animals from the Paleozoic to the present. Emphasis is placed on evolutionary relationships, anatomical and physiological characteristics of major phyla, and how they fit into their respective environments.

REQUIRED TEXTS: Miller SA, Tupper TA. (2019) [Zoology](#), 11th Edition. McGraw Hill; Because the 11th edition is substantially different from the prior editions, it is required.

RECOMMENDED TEXT: Alden P, Cassie B. 1999. [National Audubon Society Field Guide to the Mid-Atlantic](#), 1st Edition. Knopf. 0-679-44682-6. Available in the NVCC Alexandria bookstore, and on reserve in library. Please note that amazon prices for the field guide seem very inflated. Also, you can use alternate sources or field guides to learn the animals. Normally I have a lot of these to lend out to students. However, because covid hit, many of the copies that I lent out never made it back to campus. I recently purchased five new copies and will donate them to NVCC on January 12th so that you can check them out for the entire semester (along with a pair of binoculars). Please be sure to return these at the end of the semester so that others who may be financially constrained can use them!

COMPETENCIES: The student should be able to read and express him/herself both orally and in writing on a college freshman level as measured by a college English competency examination (ENG 111 or permission of instructor).

EVALUATION: Students will be graded according to the results of four hourly exams (400 points), three lab exams (300 points), very short post-labs quizzes (totaling 100 points), lecture attendance (totaling 100 points), and a wildlife alert assignment (30 points). The lecture component of this course (totaling 70% of your final grade) will be based on 4 in-class exams, attendance, and class participation. Exams are predominantly multiple choice and true/false questions. Respondus lockdown browser is required for exams, but **all exams are open notes** (notes mean a hard copy of handwritten/printed notes only, unless you have a memorandum of accommodation). A webcam is required for this course, and for exams. Your lecture grade = points received/points possible x 100. Your lab grade = points received/points possible x 100. Your overall course grade (0.7 x Lecture %) + (0.3 x Lab %). Exams that are turned in after the due dates/times will not be scored (unless you have an accommodation). There are no make-up exams for unexcused absences on the day of the exam. Excused absences require documentation. I do not go over exams during class, but I will go over exams with you via zoom outside of class time if you'd like. The final exam is not cumulative. Please note that the [final exam](#) times are often different from your normal class meeting time. There are extra credit opportunities in this course. You may submit up to five ethograms (10 points each) and attend a field trip (40 points). If you can't make the field trip (if it even happens), you can submit two additional ethograms and one additional wildlife alert. Additionally, there is a 10-point extra credit syllabus quiz. These extra credit assignments total 100 extra credit points.

STUDENTS WITH SPECIAL NEEDS: Students with physical disabilities who may require accommodations are encouraged to contact the college center for students with disabilities. Students with learning disabilities should contact [disability services](#). I cannot make accommodations unless I'm presented with the appropriate accommodations form.

PLAGIARISM, ACADEMIC HONESTY AND CONDUCT: At Northern Virginia Community College, we expect the highest standards of academic honesty. Academic dishonesty is prohibited in accordance with the Student Conduct, Rights and Responsibilities described in the [student handbook](#). NVCC's policies prohibit cheating on examinations, unauthorized access to examinations or course materials, plagiarism and other proscribed activities. **Students that violate plagiarism and academic honesty codes will receive a failing grade and will be expelled from this course.** If a student behaves in a hostile or disruptive manner, or presents any indication that he/she is a harm to themselves or others, a formal request for assistance to [NOVACARES](#) will be submitted, and the police may be contacted.

CANCELLATION DAYS: In the event of class/lab cancellation, we will resume where we left off during the next meeting. For example, if we were to have an exam scheduled on September 1, and there was a colossal power outage that prevented all of us from accessing the internet, the exam would take place on our next scheduled meeting on September 7th.

IMPORTANT DATES, AUDIT POLICY AND INCOMPLETES (EXTENSIONS): For critical dates regarding refunds, withdraw, holidays, etc. click [here](#). Auditing this course requires instructor permission. Incompletes are only granted if the student's circumstances are dire (e.g. health issues, family issues, documented work conflict). Incompletes will only be granted if students have completed all lab assignments, three lecture exams, and two lab exams. Incompletes must be approved by the division dean and provost. Health claims must be documented by medical professionals. Final exam times are different than your normal class meeting time. They are hyperlinked below.

COMMENTS ON SUBMITTING WORK: Your work must (1) be free of common spelling errors and typos, and (2) contain one font only, please be consistent. If you cut and paste, clean it up before submitting. Use Times New Roman or similar font. Use only one color, black unless otherwise specified). When submitting work via canvas please label it as the following (use caps lock): LAST NAME_ASSIGNMENT_DATE. All written assignments (e.g. wildlife alerts, ethograms, and the field trip report) must be proofed by the writing center staff before submission. They will provide you with verification of correspondence. For assistance with writing contact staff at academic center for reading and writing:

1. Bisdorf room AA 229; 703-845-6363
2. writinghelp@nvcc.edu
3. [Writing Center Website](#)

EMAILS AND CANVAS DISCUSSIONS: Please use proper English when composing emails and posting discussions. Please keep writing somewhat formal, free of slang and as grammatically correct as possible. Please address me in the emails as Dr. or Professor Tupper, not as "hey." It's fine to call me by my first name after the semester has ended. I will reply to your emails within 24 business hours from its sent time. There are times when I miss an email, or it gets sent to my junkbox or "other" list. If you do not hear from me within 24 business hours, please just email me again. That said, due to the volume of email that I receive, I may not reply to your emails unless you ask me a specific question. You don't have to email me letting me know that you are going to be late to class, leave early from a class, if you are going to miss a class, or if you have missed class. Please do not email me asking for any logistics or instructions that I have explained in a previous class that you did not attend. For those types of questions, please use the discussion board to ask your classmates. Remember, our lectures are recorded. Additionally, please do not email me asking for extensions. Due dates are fixed. Don't email me asking for extra credit: just complete the regular credited (and preassigned extra credit) assignments on time. However, please email me if you have questions about the course content or if you want to set up a time to meet via zoom and discuss some of the course content. I will work hard to help you learn the material. Also, please email me if there are serious circumstances that are beyond your control that may need my attention (i.e. health or job-related issues or conflicts that may result a prolonged absence from class).

INTRODUCTORY LETTER: Please write a brief statement and include something semi-personal about yourself, (e.g. a couple of hobbies/sports/major, etc.). Maybe also let us know where (if) you work and how many hours you work per week. I am sure your classmates (myself as well) are interested to know a little about you. Please include your name, and what you preferred to be called. Post this on the discussion board during the first week of the class.

GENERAL COMMENTS ON SUCCESS IN THIS COURSE, AND MISCELLANEOUS RULES Doing well in this course requires a substantial commitment. This course covers evolutionary hypotheses, systematics, taxonomy, anatomy and physiology. By nature, these topics are challenging. You need to set aside quite a bit of time for reviewing lecture notes, reading, and studying after and before every lecture. The lab material is also time consuming. You will likely need another couple of hours a week to learn the lab material as well (see Table 1 below). I expect citations in your papers to follow CSE ([Council of Scientific Editors](#)) citation guidelines. If citations do not follow these guidelines, then points will be deducted. There are no exceptions. A few last comments: please make use of the discussion board and become friendly with other students in the class. It helps calm anxieties about the course if you have some peer support. Be on time to class. I may not check the zoom waiting room beyond 10 minutes after the start of lecture (and lab). Log in early to class to avoid being late due to some technical glitches or hardware issues. It's important that you approach this virtual class like you would an in-person class: It is critical that you take notes via pen and paper. For most people, seeing information, hearing information, and physically writing information is superior to computer use when it comes to getting the information into your short-term memory. So, get a notebook, and be prepared to write. Much of the zoology lab includes dissection. Although you won't be doing the dissections this semester, you are still required to know the information presented in the lab handouts—this information will include images and videos of animals that I recently dissected. These animals lost their lives so that we could learn. Please take note of this fact and do your very best to take the lab portion of the course seriously and learn the lab material that I present.

Zoology requires participation. Here's what I mean: I can't create an enjoyable atmosphere via zoom by just lecturing to a computer screen. Although I am leading the class and have a fair amount of experience in zoology, I like to think of zoology class as all of us learning about animals together, rather than me being the expert and you being the student. The animal kingdom is so diverse and complicated that many of you who take the course likely know more about some animal species (or animal groups) than I do. Every semester, I learn from you. So, since we are learning together, we need to communicate with each other on a regular basis. Consequently, I tend to ask a lot of questions, and do a much better job facilitating the class if your cameras are on, and you respond

to questions (or ask questions of your own). I understand that some people have social anxiety and would prefer to remain quiet for that reason. If you are one of those people, please let me know ahead of time and I will not ask you direct questions in class.

In summary, let me say this: zoology is awesome. It does, however, require a time commitment. If you put in the time, and are earnest with your efforts, you will fare well in the course, and be amazed and the knowledge that you acquire. One last note: there is a fair amount of memorization required in this course. Some people don't see the point of memorizing things. However, I feel that if you can't recall it, you certainly won't be able to understand it, or effectively communicate it. Many of these complicated names and terms that you will be required to know reflect important working hypotheses—and repeated testing of those hypotheses are what science is all about.

WEEKLY WILDLIFE OBSERVATIONS: As you know, covid is requiring us to spend a lot more time behind screens. This increased screen time makes us more sedentary than usual, and in my opinion, can be unhealthy. So, one of my goals for virtual zoology is to get you outside looking at animals. I'd like for you to be able to confidently identify some local animals by sight, and by sound. To get you familiar with local animals, I have created assignments, called weekly wildlife observations (more information will be presented in canvas). If anyone has issues with going outside on a weekly basis, please let me know and we can work around it. To get some guidance on local animals, you can start reviewing the list of animals presented in the table below. This list corresponds with the book, "[a field guide to the mid-Atlantic](#)," and selected websites. If you go outside and go off a trail or walkway, wear appropriate attire. This includes long sleeves, long pants, and boots are helpful. If you have long hair, it's best if it's up, and under a hat. Before going off trail, please read links posted on canvas about chiggers, Lyme disease, poison ivy, west Nile virus and other tick-borne diseases. Weekly wildlife observations are extra credit. You can submit up to five, totaling 50 extra credit points. You can even do these through your window, with binoculars.

OPTIONAL FIELD TRIP: Under normal circumstances we have a (graded) day-long field trip to the [Smithsonian Environmental Research Center](#). This field trip is led by me, and a highly accomplished Smithsonian biologist, Robert Aguilar. Unfortunately, I am not sure if SERC will be opened to the public by the time we're ready for the field trip. I'd like to meet you in person and would like for Rob teach you directly. So, if it is possible, I will still be conducting the SERC field trip using social distancing protocols and PPE. If this is not possible, I will aim for [Huntley Meadows Park](#) using social distancing protocols and PPE. Both field trips will be optional. If we meet for the field trip, wear appropriate attire. Again, this includes long sleeves, long pants, and hiking boots. If you have long hair, put it up, and under a hat. Lastly, please read the links posted on canvas about chiggers, Lyme disease, poison ivy, west Nile virus and other tick-borne diseases. Bring a snack, water, and some hand sanitizer. April 10, 17, and 24 are the potential field trip dates. If the weather on the 10th is bad, we'll go on the 17th, and if the 17th is bad, we'll try the 24th. If the 24th is also no good, we're out of luck. This extra credit assignment is worth 40 points. If you cannot make this field trip, you can make up the points by submitting two extra wildlife observations, and an additional wildlife alert.

MY PERSONAL RESEARCH: Please visit my website to learn [about me](#). You'll notice that I am a pretty active in biology and that my area of interest is conservation biology, and biological inventory and monitoring (herpetology and herpetological diseases). Together with [Dr. Christine Bozarth](#), [Dr. David Fernandez](#), and Prof. Lauren Fuchs I have been able to create a functional research program at NOVA. As NOVA students, you have a chance to become involved in my work, however there are some prerequisites that we can discuss in person should you be interested. You'll probably also notice that I am the co-author of our textbook. I get questioned about this repeatedly so I will just state this right here: I do not receive royalties for this work. I am not the lead author, and I was brought in to help improve the quality of work for the 10th edition. The reason that I require the latest edition of the book is that it is substantially different from prior editions. The field of zoology is dynamic. The evolutionary hypotheses and our understanding of phylogenetic relationships change rapidly. So, to give you the most accurate information, I require the 11th edition. I'd like you to know that I work very hard on this book and it is incredibly time consuming. Please take the time to read the assigned chapters and, if you feel so inclined, provide us with some feedback. You'll notice that we acknowledge that the improvements made to the 11th edition are in part due to questions raised by NOVA students. Your feedback is greatly appreciated, and it matters a great deal! Also take note that I either wrote or edited much of what you will read in the textbook, so you can rest assured that there will be congruity between what I teach in lecture, what is present in the lecture slides, and what shows up on your exams.

HERPS	P#	BIRDS	P#	FISH	P#	MAMMALS	P#	INVERTS	P#	INVERTS	P#
American toad**	261	American robin**	323	American eel	250	Bobcat*	363	American copper	224	Snowy tree cricket**	210
Bullfrog*	262	Belted kingfisher	310	Atlantic menhaden	241	House mouse	354	Black widow	199	Sow/pill bugs	197
Gray tree frog*	262	Bald eagle	290	Atlantic needlefish	242	Chipmunk**	351	Bombardier beetle	RC	Springtails	RC
Green frog*	263	Barn swallow	316	Atlantic silverside	242	Coyote**	357	Bottle fly	217	Cicadas** (both)	211
Green tree frog	262	Barred Owl*	308	Brown bullhead	252	meadow vole	354	Carpenter ant	219	Termites	208
Marbled salamander	VHS	Chickadees*	319	Bluegill	255	Downy woodpecker	311	Burrowing crayfish	197	Viceroy	228
E. cricket frog	VHS	Black vulture	288	Brook trout	254	Eastern cottontail	350	Differential grasshopper	209	Water boatman	212
Pickerel frog*	263	Blue jay*	317	Chain pickerel	253	Flying squirrel	353	Dragonflies (various)	203+	Water strider	213
Red-backed salamand	260	Canada goose*	282	Green sunfish	RC	Gray squirrel**	352	Dragonfly nymph	202	Whirligig beetles	214
Red spotted newt	258	Cardinal*	333	Hogchoaker	248	Groundhog	351	E. tiger swallowtail et al.	223	Wolf spider	199
Slimy salamander	260	Carolina wren	320	Bass (both lm/sm)	256	Muskrat	355	Fall field cricket**	210	Wooly bear	233
South leopard frog**	263	Common grackle	341	Mummichog	242	Raccoon**	357	Fishing spider	199	Yellow jacket	220
Spotted salamander	258	Eastern bluebird	321	Naked goby	RC	Red fox**	358	Flat-backed millipede	197	Ticks/chiggers	200
Spring peeper**	262	Eastern-towhee**	335	Norther pipefish	243	Shrews & moles	347	Giant water bug	RC	Garden spider	199
Wood frog	263	European starling	324	Sea lamprey/hagfish	237	Striped skunk	360	Gladiator katydid	RC	Damselflies	203
American alligator**	AO	Fish/American crow	317+	Spiny dogfish shark	239	Bats	349	Caterpillar hunter et al.	214	Earthworm	196
Black racer	268	Gray catbird**	323	Striped bass	244	Virginia opossum	346	Harvestman	200	E. tent caterpillar	231
Black rat snake	268	Goldfinch*	343	Striped blenny	RC	Weasels	361	Honey bee	220	Gypsy moth	234
Snapping turtle	265	Great blue heron	277	White perch	244	White footed mouse	354	Horse fly	217	Mantis	208
E. box turtle	266	Green-winged teal	283	3 spine stickleback	242	White tailed deer	364	House centipede	197	Micrathena	RC
N. cottonmouth	VHS	Hairy woodpecker	311	Summer flounder	249	Beaver/mound *	353	House fly	217	Milkweed beetle	215
E. painted turtle	265	Herring gull	304	Winter founder	249	Mammal tracks	345+	Leech	196	MARINE INVERTS	P#
E. worm snake	VHS	Laughing gull*	303	Pumpkinseed	255	Black bear*	359	Leopard slug	197	Barnacle	191
Five-lined skink	267	Mallard duck	283	Redbreast sunfish	255			Luna moth	231	Blue crab	193
Garter snake	271	Mourning Dove	307	Golden shiner	251			Meadow Katydid*	AO	Comb jelly	185
Hognose snake	269	Northern flicker*	312	Yellow perch	256			Mole cricket*	AO	Common sea star	195
Milk snake	269	Northern mockingbird**	323	Parts of a fish	240			Monarch	229	Grass/sand shrimp	191
E. copperhead	271	Osprey*	290	Parts of a shark	237			Millipedes	197	Moon jelly	184
N. water snake	269	Red-bellied woodpecker*	311					Stink bug	213	WF Mud crab	RC
Red-bellied turtle	266	Red-tailed hawk**	292					Northern true katydid**	210	Clam worm	185
Red-eared slider	VHS	Red-winged blackbird*	339					Painted lady	227	Sea nettle	184
Ribbon snake	271	Song sparrow	337					Diving beetle	RC	Lions Mane	184
Green snakes	VHS	Tree swallow	315					Question mark	226	Parts of a crab	192
Spotted turtle	265	Tufted titmouse*	319					<i>Physa</i>	RC	Mollusc shell parts	186
Timber rattlesnake**	271	Turkey vulture	289					Robber fly	217		
Wood turtle	265	Whip-poor-will**	309					Gastropod shell char's	186		
Parts of a turtle	264	White breasted nuthatch	318					6S Green Tiger Beetle	213		
Parts of a bird →	273→	White throated sparrow*	337					Beetle elytra and wings	213		
		Wood duck	282					Dragonfly parts & naiad	202		


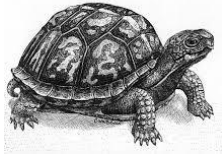
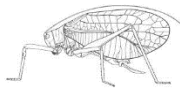

VHS = Virginia Herpetological Society Website; RC = Smithsonian Environmental Research Center Filed Trip. Not in field guide.

Please google image these animals and any other that we may find of the field trip that are not in the field guide.

AO = Audio Only; E. = Eastern; N. = Northern; + = Following Pages; * = Audio Also ** = Audio will show up on final lab exam for sure

Table 1. List of required animal identification for lab. Page numbers are from [A Field Guide to the Mid-Atlantic States](#). (<https://www.inaturalist.org/> is awesome and can help you too).

Links to Animal Audio. There's a [book with a CD](#) containing these audio files on reserve in the library.

BIRDS	MAMMALS	REPTILES & AMPHIBIANS	KATYDIDS	CICADAS & CRICKETS
American Goldfinch American Robin Baltimore Oriole Barred Owl Black-Capped Chickadee Blue Jay Brown Thrasher Carolina Chickadee Carolina Wren Chipping Sparrow Common Yellow-throat Common Muskrat Downy Woodpecker Eastern Phoebe Eastern Screech Owl Eastern Towhee Gray Catbird Great Horned Owl House Wren Mourning Dove Northern Cardinal Northern Flicker Northern Mockingbird Pileated Woodpecker Red-Bellied Woodpecker Red-Headed Woodpecker Red-Shouldered Hawk Red-Tailed Hawk Red-Winged Blackbird Song Sparrow Tufted Titmouse Whip-Poor-Will White-Breasted Nuthatch White-Tailed Deer Wood Thrush	American Beaver Black Bear Bobcat Coyote Eastern Chipmunk Eastern Fox Squirrel Eastern Grey Squirrel Flying Squirrel Gray Fox Gray Wolf Meadow Vole Moose North American Porcupine Northern Raccoon Northern River Otter Nutria (Coypu) Red Fox Red Squirrel Striped Skunk Woodchuck (Groundhog)	American Alligator American Toad Bull Frog Cope's Gray Treefrog Eastern Narrowmouth Toad Eastern Spadefoot Fowler's Toad Green Frog Green Treefrog Northern Cricket Frog Northern Leopard Frog Pickerel Frog Southern Leopard Frog Southern Toad Spring Peeper Timber Rattlesnake Western Chorus Frog Wood Frog	False Katydids Rattler Round-Winged Katydid Oblong Winged Katydid Greater-Angle Wing Lesser Angle Wing Broad-Winged Bush Katydid True Katydids Northern True Katydid Meadow Katydids Common Meadow Katydid Handsome Meadow Katydid Conehead Katydids Sword-Bearing Conehead Nebraska Conehead Slightly Musical Conehead Round-Tipped Conehead	Cicadas Scissor-Grinder Cicada Swamp Cicada Linne's Cicada Periodical cicada Mole Crickets Northern Mole Cricket Field Crickets Fall Field Cricket Ground Crickets Allard's Ground Cricket Tinkling Ground Cricket Carolina Ground Cricket Striped Ground Cricket Tree Crickets Snowy Tree Cricket Broad-Winged Tree Cricket Black-Horned Tree Cricket
				

The following taxonomy contains animal orders (in caps). Some of these will show up on your lab exam. I will tell you what will be required for your field ID test ahead of time. We will have exposure to some of these throughout lecture, on the field trip, in the wildlife alerts, and in the ethograms. Please review the orders relevant to the animals listed above. Please note that animal taxonomy sometimes changes. These groupings may not reflect the latest trends and will be updated.

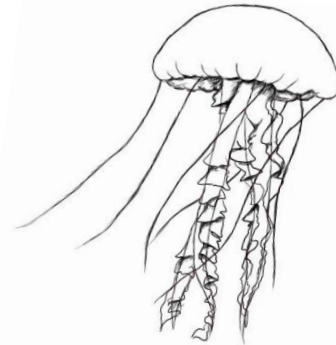
Insects

- ORTHOPTERA (straight wings)—grasshoppers, crickets and locusts; formerly mantids (now in Order Mantodea) and roaches (now in Order Blattodea). Most of the noisemakers of the insect world are in this group, and some compete with humans for food; gradual metamorphosis
- ODONATA (toothed)—dragonflies and damselflies. Large compound eyes with many facets; capture insects on the wing with legs as a scoop or basket; mate in air and females lay eggs in water where nymphs develop
- SIPHONAPTERA (tube without wings)—fleas. No wings; body is laterally compressed as adaptation to living as ectoparasites in the fur and hair of mammals and the feathers of birds, the rat flea *Xenopsylla* transmits bubonic or Black Plague to humans. In the 1300's this disease wiped out one quarter of the European population
- ANOPLURA (unarmed tail)—sucking lice. Ectoparasites of mammals from whom they suck blood; 3 species on humans—body lice, head lice, and pubic lice; can transmit diseases like trench and typhus fever.
- COLEOPTERA (sheath wings)—beetles, including fireflies, ladybugs and weevils. The largest order of insects; thickened protective forewings over delicate hindwings; about one animal species in every three is a beetle. The great English biologist, Haldane, was once asked what he had learned about the mind of God from his studies of nature-Haldane replied that God seemed extremely fond of beetles; larvae are often called grubs.
- DIPTERA (two wings)—true flies, including mosquitoes, tse-tse flies, midges, gnats, horseflies and houseflies. Piercing-sucking mouthparts and only one pair of wings; the fruit fly *Drosophila* has been extremely useful in genetic studies.
- LEPIDOPTERA (scale wings)—butterflies and moths. Sucking mouthparts; larvae are caterpillars with chewing mouthparts. Among the most beautiful insects, some migrate very long distances
- HEMIPTERA (half wings)—true bugs including bed bugs, kissing, stink and squash bugs and water striders. Piercing-sucking mouthparts, economically important, some transmit diseases

- HOMOPTERA (same wings)—includes aphids or plant lice, spittle bugs, scale insects and cicadas (This group is recently considered a suborder). Many of these puncture plants and suck their sap so they're among the most important orders of insects
- ISOPTERA (equal wings)—termites (“white ants”). Like ants these are social insects that live in colonies, they eat cellulose substances that are digested in the intestines by symbiotic flagellates. Beneficial in forests by decomposing fallen deadwood, harmful in homes especially in tropics
- HYMENOPTERA (membrane wings)—ants, bees, wasps and hornets. Over 100,000 species; although most members are solitary, they are sometimes called the “social insects”, meaning that some species tend to live in colonies where all individuals are offspring of one mother (queen)
- NEUROPTERA (nerve wings) —The insect order Neuroptera, or net-winged insects, includes the lacewings, mantidflies, antlions and their relatives. The adults of this order possess four membranous wings, with the forewings and hindwings about the same size, and with many veins. They have chewing mouthparts and undergo complete metamorphosis.
- COLLEMBOLA (glue wedge) —These are not insects but are related entognathans. Known as the springtails, their abdomen is equipped with a forked springing appendage that allows them to jump great distances. The abdomen also bears a tube called the collophore, which may be used for righting themselves after jumping. Collembola are named after their collophores, which were once thought to be sticky structures used for stabilization. First fossil hexapods where collembola.

Fishes

- MYXINIFORMES—Hagfishes
- PETROMYZONIFORMES—Lampreys
- SELACHIFORMES—Living sharks and rays
- ANTHRIFORMES—The silversides
- BELONIFORMES—The needlefishes
- CLUPEIFORMES —Herring-like fishes, tarpons, salmonids (salmon, trout) and relatives
- ESOCIFORMES—Pike, pickerel
- CYPRINIFORMES—Goldfish, carp, minnows, suckers
- ANGUILLIFORMES—Eels
- CYPRINODONTIFORMES—Livebearers, the killifishes and guppies
- PERCIFORMES—Perchlike fishes, perch, sunfish, bluegill, bass, etc.
- PLEURONECTIFORMES—Flatfishes
- SILURIFORMES—The catfishes
- SYGNATHIFORMES—The pipefishes



Amphibians

- CAUDATA—Salamanders and newts
- ANURA—Frogs and toads

Non-Avian Reptiles

- SQUAMATA—Snakes and lizards
- CHELONIA or TESTUDINES—Turtles and Tortoises



Avian Reptiles (Birds)

- CICONIFORMES—Herons, bitterns, storks, ibises, flamingoes (herons sometimes in Pelecaniformes)
- ANSERIFORMES—Waterfowl, ducks, geese, etc.
- FALCONIFORMES—Vultures, hawks, ospreys, falcons
- COLUMBIFORMES—Pigeons, doves
- STRIGIFORMES—Owls
- CAPRIMULGIFORMES—The goatsuckers, nightbirds, whip-poor-will, chuck will's widow, nighthawks
- PICIFORMES—Woodpeckers, flickers

- PASSERIFORMES—The songbirds: flycatchers, larks, swallows, jays, crows, titmice, nuthatches, creepers, bulbuls, wrens, mimic thrushes (mocking and catbirds), thrushes, kinglets, pipits, waxwings, shrikes, starlings, vireos, wood warblers, weaver finches (house sparrow, European tree sparrow), blackbirds, tanagers, finches

Mammals

- ARTIODACTYLA (even-toed hoofed animals)—Hoofed animals with an even number of toes include those that ruminate, or digest their food in four-chamber stomachs and chew cuds, and those that do not ruminate. Those that ruminate are the families Girrafidae (giraffes). Cervidae (deer, moose, reindeer, elk). Antilocapridae (pronghorn antelope), and Bovidae (cattle, bison, yaks, waterbucks, wildebeest, gazelles, springboks, sheep, musk oxen, goats). Non-ruminators include the families Suidae (pigs), Tayassuidae (peccaries), Hippopotamidae (hippopotamuses), and Camelidae (camels, llamas).
- CARNIVORA (meat-eaters)—There are two suborders of these toe-footed creatures. They include the Canidae (wolves, dogs, jackals, foxes), Ursidae (bears, giant pandas), Procyonidae (coatis, raccoons, lesser pandas), and Mustelidae (martens, weasels, skunks, otters), all part of one superfamily that is characterized by long snouts and unretractable claws; and Felidae (cats, lions, cheetahs, leopards) Hyaenidae (hyenas), and Viverridae (mongooses, civets), all of which have retractable claws.
- CHIROPTERA—(bats) There are two suborders of bats, the only mammals that can fly. Suborder Megachiroptera contains one family, the Pteropodidae (flying foxes, Old World fruit bats). Suborder Microchiroptera contains 17 families, including: Rhinopomatidae (mouse-tailed bats), Emballonuridae (sheath tailed bats), Craseonycteridae (hog-nosed or butterfly bats), Noctilionidae (bulldog or fisherman bats), Nycteridae (slit-faced bats), Megadermatidae (false vampire bats), and Rhinolophidae (horseshoe bats).
- LAGOMORPHA— (pikas, hares, and rabbits). Two families make up this order: Ochotonidae (pikas) and Leporidae (hares and rabbits of all sorts).
- MARSUPIALIA—(pouched mammals). Included among these are the families Caenolestidae (rat opossums), Didelphidae (true opossums), Dasyuridae (native cats, native mice), Notoryctidae (marsupial moles), Myrmecobiidae (numbats), Peramelidae (bandicoots), Phalangeridae (koalas), Vombatidae (wombats), and Macropodidae (kangaroos and wallabies).
- RODENTIA—(gnawing mammals). The most prolific mammals, Order Rodentia includes three suborders. It takes in the families Aplodontidae (mountain beavers), Sciuridae (chipmunks, squirrels, marmots), Cricetidae (field mice, lemmings, muskrats, hamsters, gerbils), Muridae (Old World mice, rats), Heteromyidae (New World mice), Geomyidae (gophers), and Dipodidae (jerboas).



A timber rattlesnake that we were monitoring.

Tentative Lecture Schedule			
Lecture Unit	Lecture Topic	Chapters and Notes	Date
1. Introductory Material, Origins and the Basal Phyla	Course intro, notes on animal origins, and intro to the basal phyla	Browse chapter 1. Take note of figure 1.4 and know the answers to the end of chapter questions. Begin chapters 8, and 9.	January 27 & Jan 29
	Origins, and second installment of the basal phyla	Chapters 8 and 9. Be sure you review end of chapter summaries. If you know what these summaries mean, you are in good shape. <u>Do this for all chapters.</u> Read history of zoology document posted in canvas modules unit one materials.	February 3 & 5
	Exam 1—90 min		February 10 at 9:30 am
2. Protostomia 1: The larger and lesser known lophotrochozoan phyla	Platyhelminthes and Selected Smaller Lophotrochozoan Phyla	Chapter 10	February 10 & 12
	Molluscs, Annelids and Selected Lesser Known Lophotrochozoan Phyla	Chapters 11 & 12	February 17 & 19
	Exam 2—90 min		February 24 at 9:30 am
3. Protostomia 2: Ecdysozoa	Cycloneuralia	Chapter 13	February 24 & 26
	Panarthropoda	Chapter 14	March 3 & 5
	Exam 3—90 min		March 17 at 9:30 am
4. Deuterostomia	Ambulacraria and intro to the chordates	Chapters 16 & 17	March 17 & 19
	Fishes	Chapter 18	March 24 & 26
	Amphibians & reptiles	Chapter 19	March 31 & April 2
	Reptiles & birds	Chapter 20	April 7 & April 9
	Birds & mammals	Chapter 21	April 14 & 16
	Chordate catch up		April 21 & 23
	Exam 4—100 min		April 28th at 8 am

Tentative Schedule of Lab Assignments				
Lab Week	Content	Field Identification (see table below)	Ethogram	Date
1	Initial lab meeting and porifera assignment	Start from the marine invertebrates in column six and work backward. Mollusc shell parts to garden spider	1	Jan 29 th
2	Cnidaria	Ticks and chiggers through question mark.	2	Feb 5 th
3	Platyhelminthes	Diving beetle through flat-backed millipede	3	Feb 12 th
4	Mollusca	Fishing spider to bats	4	Feb 19 th
5	Annelida	Striped skunk to redbreast sunfish	5	Feb 26 th
6	Ecdysozoa	Pumpkinseed to Atlantic silversides	6	March 5 th
7	Basal Phyla and Protostome Lab Exam	Atlantic needlefish to laughing gull	7	March 19th at 10:00 am
8	Echinodermata	Herring gull to American robin	8	March 26 th
9	Chordata: Fishes	Parts of a bird through snapping turtle	9	April 2 nd
10	Chordata: Comparative anatomy and Hominid Lab, and Wildlife Alert	Black rat snake through American toad	10	April 9 th
11	Deuterostome Lab Exam			April 16th at 10:00 am
12	Field Identification quiz	I will tell you which animals and sounds to focus on ahead of time		April 30th at 10:00 am.

