Biol 1409: Scavenger Hunt

You will be asked to find, collect, and identify some of a variety of organisms as we progress through our survey of the major kingdoms of life. There is a wide variety of items to choose from, they are described on the course website.

You must select two items from each kingdom. You will need to bring in a total of 10 different items during the semester for 5 points each; for a total of 50 points toward your semester grade. The items you bring in are due during the lab periods devoted to that particular kingdom, see your syllabus for more specific due dates.

The Scavenger Hunt also offers opportunities for extra credit; some are as noted for specific items, but you can also get 1 point extra credit for each additional item you bring in after you get your 10 points for each kingdom. These extra points will be counted toward the 25 additional extra credit points possible in the course (see below).

To receive full credit for the items you bring in, you must adhere to the following rules:

- you bring them in on the correct day as indicated by the packet & syllabus
- all items must be accompanied by a “Hunting Tag” (copied from last page)
- you cannot purchase items unless it is specifically permitted in the instructions
- you will not get your credit unless you bring in exactly what is asked for; that means you need to make sure you know exactly what to collect - do some research, look it up, don’t just guess and bring in something remotely like what is asked for and expect to get credit for it
- use common sense when collecting; eg. don’t bring in anything that might endanger the class (eg live pathogens or parasites, venomous animals, poison ivy, etc), don’t kill vertebrates just to collect for this project, don’t steal nests that are “in use”, don’t violate laws and bans on hunting or collecting certain lifeforms, eg. we don’t want any endangered species, etc;
- you will not get these items back; so don’t bring in a family treasure – the idea is that you actually get out into the real world and try to find this stuff yourself.

Bacterial Kingdoms

You can bring in your items during the labs on the bacterial kingdom. Make illustrations as required directly on the “Hunting Tag” form or on a separate sheet of paper.

**B-1. Secure some wild bacteria**
- any sample of soil or water, etc, that you believe would be loaded with bacteria
- make wet mounts, draw them; describe them
- indicate where you collected the sample
- explain why you believed the sample would contain lots of bacteria

**B-2. Collect some commercially important bacteria**
- NOT a product made with bacteria, but a product that actually CONTAINS bacteria.
- you can purchase these
- make wet mounts, draw what you see
- describe their shape & movement, etc
- describe their role in making that product – be specific

**B-3. Harvest some root nodules**
describe the symbiosis and the benefits to both organisms involved

B-4. Collect an **autotrophic prokaryote**
make wet mounts, draw what you see
use guides available to try to identify the organism

Protist Kingdom

PR-1. Secure a **sample of water or soil** that you believe will have lots of algae &/or protozoa in it.
explain why you expected this sample to have algae in it
make wet mounts, sketch three different kinds of algal cells and attempt to identify the algal group to which each belongs; eg diatoms, green, fire algae, etc

PR-2. Find a **commercially important alga**; NOT a product *made with* algae, but a product that actually CONTAINS algae.
you can purchase this
describe how the alga is used to make the product

PR-3. Poach a seaweed
use information provided in lab and any identification guides available to try to identify what kind of seaweed you have
submit your sample with the Hunting Tag attached
(additional 2 pts EC if you properly preserve your sample - see instructions provided)

PR-4. Collect some “**green slime**” from a pond, creek, stream, lake, etc
make wet mounts and draw what you see
use keys to try to identify what specific kingdom they represent
describe and try to identify one example each of a bacterium, an alga and a protozoan from the sample

PR-5. Capture one of the following beasts:
**Vorticella, Paramecium, Stentor, Amoeba, Volvox, Synedra, Ceratium, Euglena**
make a wet mount, and identify it
have your instructor verify that you did indeed capture the correct life form
describe its general characteristics
sketch the organism

PR-6. Capture a **slime mold** (2pts EC)
diagram and describe it
outline its general life cycle

PR-7. Collect a **water mold** (1 pt EC)
make a wet mount and draw and describe what you see

Fungus Kingdom

F-1. Secure a **mold or yeast used to make a food, drink,** or a commercial product
the product must actually *contain* the fungus
make a wet mount
draw and describe the fungus that you find
describe how it is used to make the product

F-2. Capture a **fruiting body** of a fungus
use the key provided in lab to identify the major group to which it belongs
submit your sample with the Hunting tag attached

F-3. Make a **spore print** of a fungus- see instructions attached
identify the fungus as accurately as you can
submit your spore print with the Hunting Tag attached

F-4. Collect a lichen
identify the kind of growth form of the lichen as described in this exercise
use the websites listed to try to identify the lichen
describe how this specific lichen is an example of symbiosis and the kind of symbiosis it is
submit your sample with the Hunting Tag attached

Plant Kingdom
(EC press and properly dry and label any complete plant specimen that you bring in for your scavenger hunt - see information attached)

PL-1. Collect 2 plants, one that has a taproot and another that has a fibrous root
Describe the functional difference between the two
submit your sample with the Hunting Tag attached

PL-2. Find 3 examples of trichomes
be careful; none from poison ivy or bull nettle, etc
look at the trichomes under the dissecting scope and draw some of them
based on lecture or webnotes, which of the three major functions do your examples represent
submit your sample with the Hunting Tag attached

PL-3. Collect a sample of periderm - but not from a live plant!
Identify its source and describe its appearance
Name the tissues found in it
submit your sample with the Hunting Tag attached

PL-4. Collect a sample of xylem - but not from a live plant
describe its general function
submit your sample with the Hunting Tag attached

PL-5. Harvest three different shaped leaves from 3 different plants
use the handout from lab to describe their shapes as accurately as possible
tape your leaves to the Hunting Tag and turn it in

PL-6. Snare two different plant organs; one a vegetative organ and the other a reproductive organ
describe the specific function of each organ
name the tissues each contains
submit your sample with the Hunting Tag attached

PL-7. Capture a sperm cell of a conifer or flowering plant
Make a wet mount, and draw what you see
Submit your sample with the Hunting Tag attached

PL-8. Bring in a fern that is not really a fern.
Explain why it is not. Be Specific
submit your sample with the Hunting Tag attached

PL-9. Capture a fiddlehead
explain what it is
submit your sample with the Hunting Tag attached

PL-10. Bring in a moss that is not really a moss.
Explain why it is not. Be Specific
submit your sample with the Hunting Tag attached

PL-11. Collect a gametophyte,
draw it
to which of the 4 plant groups does it belong
what is its function
submit your sample with the Hunting Tag attached

   Why is it called that
submit your sample with the Hunting Tag attached

PL-12. bring in a SINGLE conifer leaf; ONLY 1.
describe its adaptations to its environment
submit your sample with the Hunting Tag attached

PL-13. Find a male pinecone and wrestle it in.
   what is its function
submit your sample with the Hunting Tag attached

PL-14. Capture an embryonic pine tree
submit your sample with the Hunting Tag attached

PL-15. Collect a monocot
   Identify it as accurately as you can
   Describe the characteristics that make it a monocot
submit your sample with the Hunting Tag attached

   Explain why it is adventitious and its specific function
submit your sample with the Hunting Tag attached

PL-17. Bring in an example of a modified root, a modified stem and a modified leaf.
   you can purchase these
   Describe the “new” function of each.
   submit your samples with the Hunting Tag attached
   (You will get a point extra credit if your example is unique, ie. no other student in the class
   brought in the same thing)

   dissect it, draw what you see and label the main parts.
submit your sample with the Hunting Tag attached

PL-19. Collect one NATIVE flowering herb that is either edible or has medicinal properties.
   Describe its uses.
submit your sample with the Hunting Tag attached

PL-20. Bring in a fruit that is not a fruit.
   Explain why it is not.
submit your sample with the Hunting Tag attached

PL-21. Bring in an edible bud
   you can purchase this
submit your sample with the Hunting Tag attached

PL-22. Bring in an example of a flower that is pollinated by wind.
   Explain the process of pollination
submit your sample with the Hunting Tag attached

PL-23. Bring in a flower that is pollinated by bats.
   Explain the process
submit your sample with the Hunting Tag attached
PL-24. Harvest a flower of many flowers
   Explain what this means
   submit your sample with the Hunting Tag attached

PL-25. Secure a fruit that is dispersed by wind.
   Try to identify it
   Explain the process of dispersal
   submit your sample with the Hunting Tag attached

PL-26. Collect a fruit that is dispersed by water.
   Try to identify it
   Explain the process of dispersal
   submit your sample with the Hunting Tag attached

PL-27. Capture a germinated seed
   Diagram and label its parts
   submit your sample with the Hunting Tag attached

Animal Kingdom

A-1. Track down an immature animal; eg a larva, nymph, embryo, pupa, etc
   but not your kid brother or other vertebrate
   preserve in 70% alcohol
   identify the stage of development it represents and its adult form
   submit your sample with the Hunting Tag attached

A-2. bring in a live example of a “simple animal” such as hydras, sponges, flatworms, or
   (EC) roundworms
   use the key provided to try to identify to what group it belongs
   sketch the animal, preserve it in 70% alcohol
   submit your sample with the Hunting Tag attached

A-3. Go “bear hunting” and bag some water bears
   describe their behavior
   name the group (phylum) to which they belong
   submit your sample with the Hunting Tag attached

A-4. Collect an animal ectoparasite (not of a human) or (EC) an endoparasite
   do not collect endoparasites from dead animals
   don’t kill a live animal only for this purpose;
   the best way to get them is if you fish or hunt regularly
   preserve it by placing in a small bottle of 70% rubbing alcohol
   identify the parasite as well as you can and describe how it lives
   submit your sample with the Hunting Tag attached

A-5. Capture an animal that is a commensal or mutualist of humans
   do not collect an endoparasite
   preserve in 70% alcohol
   identify it as well as you can and describe how it lives
   submit your sample with the Hunting Tag attached

A-6. Collect an animal that is a pest of dry grains, pantries, flours, etc
   preserve in 70% alcohol
   identify it as well as you can and describe how it lives
   submit your sample with the Hunting Tag attached

A-7. Collect an animal that is a pest in flower or veggie gardens
preserve in 70% alcohol
identify it as well as you can and describe how it lives
describe how it can be controlled
submit your sample with the Hunting Tag attached

A-7. Bring in a **fossil animal** from the central Texas area
identify it to class
is the group alive or extinct today
describe what kind of modern animal it is most closely related to
submit your sample with the Hunting Tag attached

A-8. Bring in a **vertebrate skull** that you *recently* collected (not one you’ve had for years)
don’t kill an animal to do this; don’t bring in a dead animal head still with soft tissue on it
identify the animal
Describe how the size and shape of its teeth related to its diet
submit your sample with the Hunting Tag attached

A-9. Bring in any *other kind of feather*, BUT NOT a flight feather
identify the bird, the kind of feather and its function for the animal
submit your sample with the Hunting Tag attached

A-10. Collect an **animal nest**
not one currently in use – an abandoned nest
identify the animal that made it as accurately as possible
submit your sample with the Hunting Tag attached

A-11. Collect an **exoskeleton**
exoskeleton only, no other part of the animal
describe what it is made of
describe all its functions (for the animal it belonged to)
submit your sample with the Hunting Tag attached

A-12. make a plaster cast of animal **tracks or burrows**
identify the animal that made the tracks or burrows
submit your sample with the Hunting Tag attached

A-13. Capture an **invertebrate that is not a worm or mollusk**
preserve it in 70% alcohol
Identify it as accurately as you can
submit your sample with the Hunting Tag attached

A-14. Collect an **owl pellet**
what does it consist of
how is it formed
submit your sample with the Hunting Tag attached

A-15. Harvest a small sample of **THREE different kinds of mammal fur**
make a slide of each
draw them and describe their similarities and differences
submit your sample with the Hunting Tag attached

A-16. Secure a **vertebrate tooth**
Identify which class of vertebrate it came from
submit your sample with the Hunting Tag attached

A-17. Collect a **sessile animal**
identify the phylum and the class
submit your sample with the Hunting Tag attached
A-18. Find some **spicules**
   describe what they are made from - be specific
   submit your sample with the Hunting Tag attached

A-19. Ensnare one of the following beasts:
   a **rotifer**, a **horsehair worm**, a **water mite**, a **gastrotrich**, a **tadpole shrimp**, a **water flea**, a **fish louse**, a **caddisfly**
   view with the appropriate microscope and draw
   identify it as one of the above animals
   have your instructor verify that it actually is what you have identified it to be
   if not microscopic, preserve in 70% alcohol and submit your sample with the Hunting Tag attached

A-20. Expose some **gall makers**
   collect some plant galls and extract any animals inside, usually an insect or mite
   identify the animal as accurately as you can
   preserve both in 70% alcohol
   describe how the gall was constructed
   submit your sample with the Hunting Tag attached
Miscellaneous
Collecting & Preserving Methods

In most cases, credit for your scavenger hunt items does not require that you use any of the techniques below to prepare your sample. However, if you would like to receive extra credit (as indicated for specific items) you might want to use one of the techniques described below. If you have any other questions ask your instructor.

Bacteria
No good simple techniques are available to preserve bacteria

Protists
No good simple techniques are available to preserve unicellular or colonial protests

Collecting and Preserving Seaweeds

Seaweeds are common on rocks and jetties along the coast. Sargassum and other seaweeds also frequently wash ashore and can be collected if in good shape.

Collect the seaweed, rinse it off with fresh water and blot dry with paper towels
Place between two sheets of wax paper or aluminum foil and proceed using the technique for pressing plants below

Fungi

Collecting and Preserving Fungi

You can search your yard and nearby parks for different kinds of fungi; they are easiest to find a few days after a rain but some can also be found almost anytime growing on rotting wood, or in very rich organic soil. You may even find some in your indoor plant pots. Another good source of fungi is stale bread, old fruit.

Collect mushrooms using a trowel or knife to ‘dig out’ the mushroom from its substrate. Some structures need for identification are at the very base of the stalk (stipe); if you just pull it up you may not get these parts.

Place your specimen in a box or paper bag (not a plastic bag) and allow it to dry. A light box will speed the drying process.

If you have a camera with a macro lens or a fairly good closeup lens you can try photographing them instead. But you will need good, crisp photographs at fairly close range to have any hope of identifying them accurately.

Making a Spore Print

If you find mushrooms you might want to attempt to make a spore print. Spore prints can provide a permanent record of the gill pattern and spore color of the larger fruiting body:

a. Remove the stem by cutting it close to the cap.
b. Place the cap, gills down, on a white sheet of paper (some spores are white or light colored and would appear in better contrast on a darker color of paper).
c. Cover to prevent air drafts and leave undisturbed for several hours or overnight
d. in the lower right corner label it with the name of the general kind of fruiting body, your name, the location where you collected it, and the date you collected it
e. Spray the finished print with clear lacquer or fixative or use clear contact paper to cover

Plants

Collecting & Drying Plant Specimens

To collect and preserve plant specimens you will need to have a plant press. A plant press is easily made or can be checked out from your instructor, a small deposit (such as your firstborn child or favorite pet) is required for checkout.

A plant press consists of a:
- wooden frame up to 12 X 18 " (about the size of a newspaper page)
- several pieces of corrugated cardboard about the same size
- a stack of newspapers
- two adjustable straps or ropes

In the case of herbaceous plants the entire plant should be collected. In the case of large and/or woody plants, representative vegetative structures should be collected if possible. Notes should be made describing the size and general appearance of the plant if the entire plant was not collected. A large plant can be bent or folded to fit your press. In most cases, specimens collected should include both vegetative and reproductive parts (either flowers or fruits or both). Plants should be immediately placed in the plant press when you collect them.

When specimens are collected they should be placed between one or two sheets of newspaper, then between two pieces of cardboard before being placed in the plant press. Tighten the straps to put some pressure on the plant.

Thick stems, succulents (such as cacti) or large fleshy fruits (such as tomatoes, apples, etc) may be halved or sectioned to dry more effectively. You don't want the total specimen to be any thicker than about a half inch. Very large structures such as pine cones, etc can be preserved and stored separately in a drawer rather than on the specimen sheet. See your instructor for helpful tips.

Plants in the press can be dried on a light box, in your attic or out in the sun on a hot dry day. The press must be lifted off the ground so air can flow through the cardboard around the plants. Depending on your method it may take 3 to 7 days for your plants to dry. Plants that do not dry quickly enough may become moldy and useless.

Mounting Plant Specimens

Remove the specimen from the plant press only after it has been thoroughly dried. You will need to get a piece of special mounting paper from your instructor. Do not substitute other kinds of paper or cardboard for this purpose. Choose what will be the upper side of the plant and place it on the mounting board for layout. There should be room for the label in the lower right corner (see below). Turn the plant upside down and spread Elmer's glue or 'tacky glue' on various places, particularly the stems and branches. Paste the specimen on the board, place the cardboard and a small weight on the plant to insure good contact with the mounting paper. Allow to dry at least one hour before disturbing or moving.

Making a Plant Label

Your label should contain the following information:
- **Plant name**: usually Genus and species, in a few cases Genus only (ask your instructor about this; remember the genus is capitalized and both are underlined)
- **Common Name**
- **Habitat**: such as grassland, backyard, wetland, pond, desert, roadside, etc, if possible you might also mention the soil type, etc.
- **Location**: where the plant was collected; include a reference to the nearest intersection and the nearest city or town, also list the county and state.
- **Collector** (your name but you might also include other members of a group if you collected together)
Date specimen was collected

Animals

Collecting & Preserving small soft bodied animals, mainly invertebrates

Kill and preserve in jars of 10% formalin solution or 70% alcohol (ethyl or isopropyl); make label with pencil or India ink and place inside jar

Collecting and Preserving Insects

Collecting: Most adult flying insects are generally collecting using a fine net. Individual insects can be collected with forceps by searching on plants, under logs and rocks and among weeds. Insects can be placed in bags or jars and placed in the freezer for several days. This will kill most insects although a few may revive when thawed.

Mounting and Preserving: Most insects, unless very small or fleshy larvae, are best preserved by pinning and drying. Use only specially made insect pins to mount insects and pay attention to the location of the pin through the animal. Butterflies, moths and dragonflies will need to be spread on a pinning board to arrange their wings and legs and antennae.

Bones and Skulls

Clean thoroughly and allow to air dry
If desired bones can be placed in a bleach or hydrogen peroxide solution to whiten; allow to dry; place in bag or box with complete label tied to skull if possible

Nests, Feathers, Eggs, Racks, shells, feathers:

Clean up as much as possible and place in bag or box with complete label

Footprints and Burrows

Use plaster of Paris, follow directions to mix
Pour onto footprint or into empty burrow
Allow to harden
Dig around plaster to free from soil
Carefully clean and allow to air dry
Place in labeled box or bag.

Photographs

Photography can provide an excellent opportunity for originality and creativity if you have a facility with the medium and would like to express yourself in this way. However, you should only use photography as an option if you are good with a camera and have a good camera with a variety of lenses or an underwater camera for marine and aquatic organisms. It is very difficult to get good photographs of animals without either some kind of telephoto lens for birds and mammals or close up lens for fish, reptiles, amphibians, insects, etc.
The animal should fill at least one fourth of the area of the photograph.
<table>
<thead>
<tr>
<th>Hunting Tag</th>
<th>Name:_______________________</th>
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</thead>
<tbody>
<tr>
<td>Biol 1409 Scavenger Hunt</td>
<td>Semester:____________________</td>
</tr>
<tr>
<td>(If actual specimen is required, staple or tape this sheet to your specimen)</td>
<td>Kingdom:____________________</td>
</tr>
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<td>SH Item Number:______________</td>
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**Drawings, Descriptions, Written Materials, as required:**