

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” or major group. 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).

We can provide you with plastic bags, jars, containers, preservatives, insect pins, etc as needed.

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

- You collect and bring in **your OWN** samples (*this is not a shared lab activity*)
- You must collect two *different* numbered items for each of the 5 kingdoms or groups
- you bring them in on the **correct day** as indicated by the packet & syllabus
- use a **separate hunting tag** for each item; for some items you can make your drawings and descriptions directly on the hunting tag; for other items you are also asked to attach your sample to the hunting tag when you turn it in.
- you cannot *purchase* items *unless* it is specifically permitted as part of the instructions.
- you will not get your credit unless you; a. bring in *exactly* what is asked for, b. answer the appropriate questions, and c. submit a sample if requested; 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 life forms, 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.

I. The Bacteria

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 that you attach to the hunting tag.

B-1. Secure some **wild bacteria**

any sample of soil or water, etc, that you believe would be loaded with bacteria

Note: if you collect a “dry” sample such as soil or leaves, place them in a bag or jar with a little water the day before you bring them in. Once in lab, place a drop of that water on a slide to make a wet mount

indicate where you collected the sample

explain why you believed the sample would contain lots of bacteria

make wet mounts, indicate the magnification used to view the organisms, draw them;

describe the cells’ **shapes** and **arrangements** using the handout provided in lab

describe any **movement**, does the kind of movement you see indicate that the organism is **motile**? Explain.

B-2. Collect some **commercially important bacteria**

you can purchase these

find a product that is actually **CONTAINS** bacteria **NOT** a product *made with* chemicals **extracted** from bacteria,

make wet mounts, indicate the magnification used to view the organisms, draw them;

describe the cells’ **shapes** and **arrangements** using the handout provided in lab

describe any **movement** present does the kind of movement you see indicate “motility”? Explain.

describe the bacteria’s **specific role** in making that product

B-3. Purchase a product that is made using extracts or chemicals produced by bacteria, but doesn’t actually **CONTAIN** any bacteria

name the chemical and describe how that chemical is extracted and why it is used in the product *or* name the bacterial species and what specific reaction they are responsible for in making this product

submit the entire product or its packaging that includes a list of ingredients, and circle the relevant chemical, along with a hunting tag and required information attached

B-4. Harvest a plant with some **root nodules** (2 pts EC)

identify the plant as accurately as you can and describe why you expected it to have root nodules on it

with help from instructor make a slide of the bacteria in one of the root nodules, then draw & describe their shape

have the instructor verify and initial your hunting tag

describe the specific kind of symbiosis and the benefits to both organisms involved

turn in the the plant showing the root nodules with the hunting tag attached

B-5. Collect an **autotrophic procaryote**

note where you collected your sample and why you expected it to contain autotrophic procaryotes

make several wet mounts, draw and describe what you see in each

use guides available to try to identify the organism as well as you can; eg. to what specific group of bacteria do these organisms belong; how can you tell?

II. The Protists

- PR-1.** Secure a **sample of water or soil** that you believe will have lots of protists in it.
explain why you expected this sample to have protists in it
make wet mounts, sketch **three different kinds** of protists
attempt to identify the protist group to which each belongs; eg diatoms, green algae, ciliate,
etc; we have guides in lab to help you with this
verify your identifications with the instructor & have him initial it
- PR-2.** Find a **commercially important protist**; NOT a product *made with* algae, but a product that
actually CONTAINS algae.
verify this on the label
you can purchase this
identify the major group to which the protist belongs
describe how the protist is specifically processed to make the product, and verify on
ingredients label
turn in your hunting tag with sample attached or label attached
- PR-3.** Purchase a product that is made using extracts or chemicals produced by protists, but doesn't
actually CONTAIN any organisms
name the chemical and describe how that chemical is extracted and processed to make the
product
submit the entire product or its packaging that includes a **list of ingredients**, and circle
the relevant chemical, along with a hunting tag and required information attached
- PR-4.** Collect an example of a **multicellular macroscopic protist**
what exactly does multicellular & macroscopic mean?
describe where you found it
how do you know it's a protist and not a plant, animal, fungus or bacteria?
submit your sample attached to your hunting tag
- PR-5.** Poach a **seaweed from the "wild"**(make sure you know what a sea weed is) (not a
commercial seaweed product)
use information provided in lab and any identification guides available to try to identify
which general kind of seaweed you have
describe where you collected the sample
submit your sample with the Hunting Tag attached
(additional 2 pts EC of you properly preserve your sample - see instructions on course
website)
- PR-6.** Collect some **"green slime"** from a pond, creek, stream, lake, etc
make wet mounts and draw what you see
describe and try to identify one example each of a **bacterium**, an **alga** and a **protozoan**
from your sample
keys are available in lab
- PR-7.** Capture one of the following beasts:
Vorticella, Paramecium, Stentor, Amoeba, Volvox, Synedra, Ceratium, Euglena
guides are available in lab to help you identify these organisms

make a wet mount, draw it and identify it
describe its general characteristics
have your instructor initial your hunting tag to verify that you did indeed capture the correct
life form

PR-8. Capture a **slime mold** (2pts EC)

describe where you collected the specimen
diagram and describe it
how do you know it's a slime mold and not a protist or a bacterium
have your instructor verify and initial your hunting tag
diagram the general life cycle of a slime mold

PR-9. Collect a **water mold** (1 pt EC)

describe where you collected the specimen and how you identified it as a water mold
make a wet mount and draw and describe what you see
how do you know it's a water mold and not a fungus?
have your instructor verify and initial your hunting tag

III. The Fungi

- F-1.** Secure a **mold or yeast used directly to make a food, drink**, or a commercial product
the product must actually *contain* the fungus, not just chemical extracts from the fungus
you may purchase this
make a wet mount; if you have a yeast sample, add slightly warm water and let it sit for
about 10 minutes before making a wet mount
draw and describe the fungus that you find
describe how it is processed to make the product
submit your sample with your hunting tag
- F-2.** Purchase a product that is made using **extracts or chemicals** produced by fungi, but doesn't
actually **CONTAIN** any organisms
name the chemical and describe how that chemical is extracted and processed to make the
product
submit the entire product or its packaging that includes a list of ingredients, and circle
the relevant chemical, along with a hunting tag and required information attached
- F-3.** Capture a **fruiting body** of a fungus from the "wild" (**not** the grocery store)
use the illustrated key provided in lab to identify the major group to which it belongs
submit your sample with the Hunting tag attached
- F-4.** Make a **spore print** of a fungus on a separate sheet of paper- see instructions in lab for how to
do this
describe the fruiting body and identify the kind of fruiting body using the lab handout
submit your spore print along with the fruiting body with the Hunting Tag attached
- F-5.** Collect a **lichen**
identify the kind of growth form of the lichen as described in the lab & lecture
describe its characteristics
use websites or guides 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
- F-6.** Bring in some **moldy** fruit or vegetable (or any other moldy thing for that matter)
use the dissecting scope and draw and describe what you see
make a wet mount and view it on the compound microscope
draw it and try to identify the hyphae and any reproductive structures that you see
indicate the magnification you used
note whether they are sexual or asexual structures

IV. Plants

Most of these items require you to submit a sample with your hunting tag; a zip lock bag will work for most stuff; we can provide bags and/or containers for your samples if you need them

*(EC press and properly dry and label any **complete** plant specimen that you bring in for your scavenger hunt - see collecting and preserving information on line; verify with your instructor that you did indeed follow the correct procedures)*

PL-1. Collect 3 plants, one that has a **taproot**, another that has a **fibrous root**, and a third with an **adventitious root**

describe the functional difference between each kind of root

submit your 3 samples 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 a **perennial stem** - but not from a live plant!

identify its species and describe the plant's appearance

name the tissues found in the wood and the tissues found in the bark

submit your sample with the Hunting Tag attached

PL-4. 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-5. 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-6. Find the three kinds of plant tissues

collect an **annual plant** with roots, stems and leaves

make *very thin* **cross sections** of each kind of organ (the instructor will help you with this)

make wet mounts of each, draw them and identify each of the three major plant tissues in

EACH ORGAN of the plant

PL-7. Collect three plant specimens; one with **alternate** leaves, one with **opposite** leaves and one with **whorled** leaves (make sure you understand the difference between these terms)

identify to which of the four major plant groups each specimen belongs

attach your 3 specimens to your hunting tag

PL-8. Collect three different flowering plants, each with a different kind of **modified root** (but not tap, fibrous or adventitious; see lecture notes)

indicate which kind of root is on each of the plants

submit your three samples attached to a hunting tag

- PL-9.** Collect three different flowering plants, each with a different kind of **modified stem** (see lecture notes)
indicate which kind of stem is on each of the plants
submit your three samples attached to a hunting tag
- PL-10.** Collect three different flowering plants, each with a different kind of **modified leaf** (see lecture notes)
indicate which kind of leaf is on each of the plants
submit your three samples attached to a hunting tag
- PL-11.** Bring in a **fern that is not really a fern.**
explain why it is not a fern and what it really is. Be Specific
submit your sample with the Hunting Tag attached
- PL-12.** Capture a **fiddlehead**
explain what it is
submit your sample with the Hunting Tag attached
- PL-13.** Bring in a **moss that is not really a moss.**
explain why it is not and what it really is. Be Specific
submit your sample with the Hunting Tag attached
- PL-14.** Collect a plant **gametophyte**,
to which of the 4 plant groups does it belong
what is its function
submit your sample with the Hunting Tag attached
- PL-15.** bring in **A SINGLE conifer leaf; ONLY 1.**
describe its adaptations to its environment
attach the leaf to your hunting tag
- PL-16.** Find a **male pinecone** and wrestle it in.
what is its function
submit your sample with the Hunting Tag attached
- PL-17.** Capture an **embryonic plant**
cut it in half and identify the actual embryo, draw and label what you see
to which of the four major plant groups does it belong
submit your sample and drawing with the Hunting Tag
- PL-18.** Capture a **germinated seed**
use illustrations in your atlas to diagram and label its parts
submit your sample with the Hunting Tag attached
- PL-19.** Bring in an **incomplete flower**
what *is* an incomplete flower?
dissect it, draw what you see and label the main parts.
submit your sample with the Hunting Tag attached

- PL-20.** Collect one **NATIVE flowering herb** that is either edible or has medicinal properties.
name the plant
to which of the our major plant groups does it belong
describe its uses.
submit your sample with the Hunting Tag attached
- PL-21.** Bring in a **fruit that is not a fruit.**
explain why it is not.
submit your sample with the Hunting Tag attached
- PL-22.** Bring in an **edible bud**
you can purchase this
submit your sample with the Hunting Tag attached
- PL-23.** 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-24.** Bring in a **flower that is pollinated by bats.**
explain the process
submit your sample with the Hunting Tag attached
- PL-25.** Secure a **fruit that is dispersed by wind.**
identify the plant
explain the process of dispersal
submit your sample with the Hunting Tag attached
- PL-26.** Collect a **fruit that is dispersed by water.**
identify the plant
explain the process of dispersal
submit your sample with the Hunting Tag attached
- PL-27.** Collect an example of a **symbiosis** between a plant and an organism from one of the other kingdoms
describe the kind of symbiosis and its effects on each organism
submit your sample with the Hunting Tag attached

V. Animals

Most of these items require you to submit a sample with your hunting tag; a zip lock bag or small jar will work for most stuff; we can provide bags and/or containers for your samples if you need them. Some items require that you properly preserve your specimen in alcohol or using some other procedure - check with your instructor if you are unsure how to preserve your sample (part of your grade will be based on the “condition” of the specimen you turn in, eg. a nest that has been squashed in your backpack will probably not get you full credit, so take care of stuff you want to bring in)

- A-1.** Track down an **immature animal**; eg a larva, nymph, embryo, pupa, etc
but not your kid brother
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, or a **flatworm** or a (EC) **roundworm**
use the key provided in lab to try to identify to what group it belongs
have your instructor verify your identification
sketch the animal, have your specimen verified by your instructor
submit your sample with the Hunting Tag attached
- A-3.** Go “**bear hunting**” and bag some **water bears**
name the group (phylum) to which they belong
describe their behavior and movement; can you see any organs
submit your sample with the Hunting Tag attached
- A-4.** Collect an animal **ectoparasite** (not of a human) or (EC) an **endoparasite**
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 why it is considered a pest
submit your sample with the Hunting Tag attached
- A-6.** Collect an animal that is a **household pest** (find some examples on the web)
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 common pest in flower or veggie gardens (if you are not a gardener, find some examples on the web)
preserve in 70% alcohol

- identify it as well as you can
describe the damage it causes and how it can be controlled
submit your sample with the Hunting Tag attached
- A-8. Bring in a complete vertebrate skull**
don't kill an animal to do this; don't bring in a dead animal head with soft tissue still 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 at least one flight feather and one other kind of bird feather that is NOT a flight feather** identify the bird, the kinds of feather and their functions for the animal
submit your samples 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
describe how the nest is construction by the animal
submit your sample with the Hunting Tag attached
- A-11. Collect an exoskeleton that has been shed**
exoskeleton only, no other part of the animal
describe what it is made of
identify the organism as well as you can
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 an earthworm, an insect, or a snail**
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 and draw what you see, indicate the magnification used
describe their similarities and differences in appearance
EC if your samples are NOT from a dog, cat, or human
submit your sample with the Hunting Tag attached
- A-16. Secure a vertebrate tooth**
Identify which **class** of vertebrate it came from
determine if the tooth is from a **carnivore**, **herbivore** or **omnivore**
submit your sample with the Hunting Tag attached

- A-17. Collect a sessile animal**
you can purchase this but EC if you find one yourself
identify the phylum of the organism
describe where it lives and how it feeds
submit your sample with the Hunting Tag attached
- A-18. 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-19. 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
- A-20. Capture a follicle mite**
make a wet mount and draw what you see
indicate where you collected it
describe its life cycle and how it lives
preserve the animal in 70% alcohol and submit with a Hunting Tag
- A-21. Bring in a fossil animal that you collected**
record where you collected it
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-22. Bring in an animal that is an important pollinator.**
Describe the characteristics of the flower that attract this animal
List the characteristics of this animal that are important to the plant.
- A-23. Collect scales from a vertebrate animal.**
Indicated whether they are “dermal” or “epidermal” scales.
Name the group of vertebrates from which they came
Describe their specific structure and function
Submit your sample with the Hunting Tag attached