

Option Two: Insect Collection

Insects are invertebrates with three pairs of legs, usually two pairs of wings, one pair of antenna, jointed appendages, and three distinct body regions --- head, thorax, & abdomen. Insects belong to the largest phylum of animals known as arthropods. Many small arthropods are mistaken for insects such as spiders, ticks, millipedes, & centipedes. Although some insects may sting or bite, insects play an important role in nature as a food source for other animals and as plant pollinators.

By doing an insect collection, you can, not only learn beneficial and harmful insects common to LLANO COUNTY, but you will also learn structural modifications of various insects that have enabled them to survive & become such a successful and diverse group of animals.. You will also learn to use taxonomic keys to identify organisms. You may use the internet to find these keys or use library books.

Insects are found almost everywhere so look for them on plants, in water, in soil, under rocks, in rotten logs, around lights at night, etc. As you collect insects, be sure to record the name of the insect. Use different kill jars for butterflies and beetles (predator-prey) and never put too many insects in the same kill jar. Once your insect is dead (not just knocked out), use tweezers to transfer them to a small baby food jar until you arrive home to pin it. Don't leave the insects in these holding jars more than a few hours and never leave insects in kill jars more than 3 to 5 hours because of their brittle bodies. Most insects will die within 30 minutes to one hour in a newly charged kill jar.

If you are allergic to certain insect stings, have your parent collect this insect for you. From the following list that includes orders and their families, students must collect and identify 15 insects and five different orders and no two Genera (genus) can be the same I have attached 26 different orders with family names. Research carefully!!!

- A. Protura – tselontails, proturans
- B. Collembola – springtails
- C. Diplura - diplurans
- D. Thysanura - bristletails
- E. Ephemeroptera - mayflies
- F. Odonata - dragonflies & damselflies
 - 1. Gomphidae - clubtails
 - 2. Aeshnidae – darners dragonflies
 - 3. Libellulidae – skimmers, dragonflies
 - 4. Coenagrionidae – narrow winged damselflies
- G. Plecoptera - stoneflies
- H. Orthoptera - grasshoppers & crickets
 - 5. Acrididae – short horned grasshoppers
 - 6. Romaleinae – lubber grasshoppers
 - 7. Cyrtacanthacridinae – bird grasshoppers
 - 8. Acridinae - grasshoppers
 - 9. Tettigoniidae - katydids
 - 10. Gryllidae – crickets, tree crickets
 - 11. Gryllotalpidae – mole crickets
- I. Phasmatodea - walking sticks
- J. Mantodea - mantids
- K. Blattodea - roaches
- L. Isoptera - termites
- M. Dermaptera - earwigs
- N. Mallophaga - chewing lice
- O. Anoplura - sucking lice
- P. Thysanoptera - thrips
- Q. Hemiptera - true bugs
 - 12. Corixidae – water boatman
 - 13. Notonectidae - backswimmers
 - 14. Belostomatidae – giant water bugs
 - 15. Gerridae – water striders
 - 16. Cimicidae – bed bugs
 - 17. Miridae – leaf bugs
 - 18. Reduviidae – assassin bugs
 - 19. Tingidae – lace bugs
 - 20. Lygaeidae – seed bugs
 - 21. Pyrrhocoridae – red bugs
 - 22. Coreidae – leaf-footed bugs
 - 23. Aradidae – flat bugs
 - 24. Cydnidae – burrowing bugs
 - 25. Coremelaenidae (Thyreocoridae) – Negro bugs
 - 26. Scutelleridae – shield back bugs
 - 27. Pentatomidae – stink bugs
 - 28. Gelastocoridae – toad bugs
 - 29. Nepidae – water scorpions
 - 30. Naucoridae – creeping water bugs
- R. Homoptera - cicadas, aphids, hoppers, etc.
 - 31. Cicadidae – cicadas
 - 32. Membracidae – tree hoppers
 - 33. Cercopidae – froghoppers, spittle bugs
 - 34. Cicadellidae – leafhoppers
 - 35. Fulgoridae – fulgorid planthoppers
 - 36. Aphididae – aphids
 - 37. Coccidae – scale (twig or leaf)
- S. Neuroptera - dobsonflies, lacewings, antlions
 - 38. Chrysopidae – green lacewings
 - *39. Myrmeleontidae – antlions
- T. Coleoptera - beetles
 - 40. Cicindelidae – tiger beetles
 - 41. Carabidae – ground beetles
 - 42. Dytiscidae – predaceous diving beetles
 - 43. Gyrinidae – whirligig beetles
 - 44. Histeridae – hister beetles
 - 45. Hydrophilidae – water scavenger beetles
 - 46. Silphidae – carrion beetles
 - 47. Staphylinidae – rove beetles
 - 48. Cantharidae – soldier beetles
 - 49. Lampyridae – fire flies
 - 50. Elateridae – click beetles, wireworms
 - 51. Cleridae – checkered beetles
 - 52. Buprestidae – metallic wood boring beetles
 - 53. Lycidae – net-winged beetles
 - 54. Coccinellidae – lady-bird beetles (ladybugs)
 - 55. Meloidae – blister beetles
 - 56. Mordellidae – tumbling flower beetles
 - 57. Tenebrionidae – darkling beetles
 - 58. Lucanidae – stag “bug” beetles
 - 59. Passalidae – bess beetles, peg beetles
 - 60. Trogidae – skin beetles
 - 61. Scarabaeidae – dung beetles, June “bug” beetles
 - 62. Cerambycidae – long-horned beetles
 - 63. Chrysomelidae – leaf beetles
 - 64. Curculionidae – weevils
 - 65. Haliplidae – crawling water beetles
 - 66. Geotrupidae – earth-boring dung beetles
- U. Mecoptera - scorpionflies
- V. Trichoptera - caddisflies
- W. Lepidoptera - moths and butterflies
 - *67. Papilionidae – swallowtail butterfly
 - 68. Pieridae – whites, sulfurs
 - 69. Nymphalidae – brushfooted butterflies
 - *70. Sphingidae – sphinx moths, hornworms
 - *71. Saturniidae – royal moths
 - 72. Citheroniidae – regal moths
 - 73. Arctiidae – tiger moths, wooly worms
 - 74. Phalaenidae (Noctuidae) – noctuid moths, cutworms
- X. Diptera - true flies
 - 75. Tipulidae – crane flies
 - *76. Culicidae – mosquitoes
 - 77. Tabanidae – horse flies
 - 78. Asilidae – robber flies
 - 79. Syrphidae – flower flies
 - 80. Tachinidae – tachinid flies
 - *81. Calliphoridae - blow flies
 - 82. Muscidae – house flies
 - 83. Bombyliidae – bee flies
 - 84. Therevidae – stiletto flies
 - 85. Trypetidae – fruit flies, huskfly
 - 86. Stratiomyidae – soldier flies
 - 87. Drosophilidae – pomace flies
- Y. Siphonaptera - fleas
- Z. Hymenoptera - bees, ants, wasps, etc.
 - 88. Ichneumonidae – ichneumons
 - 89. Chrysididae – cuckoo wasps
 - 90. Mutillidae – velvet ants
 - 91. Formicidae – ants
 - 92. Vespidae – paper wasps
 - 93. Sphecidae – mud daubers
 - 94. Apidae – bees
 - 95. Pompilidae – spider wasps

Good Web sites for identifying Insects:

<http://bugguide.net/node/view/15740>

<http://www.whatsthatbug.com>

<http://www.life.uiuc.edu/entomology/illustrations.html>

In order to properly do an insect collection, several techniques must be learned including how to kill, pin, label, and display your organisms.

How to make a kill jar: Used to kill insects

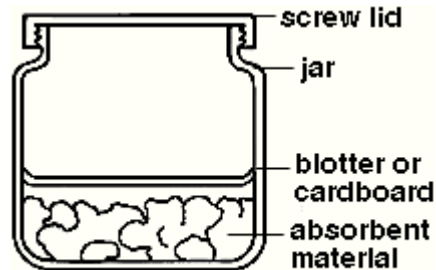


Figure 1. Killing jar

1. Use a clean, glass jar with straight sides.
2. Place a 2" - 3" layer of cotton balls in the bottom of the jar.
3. Cut a piece of corrugated cardboard the same diameter as the inside of the jar to fit over the cotton balls.
4. Carefully punch several small holes in the cardboard with an ice pick.
5. Charge the jar by adding polish remover to the cotton balls.
6. Immediately place the cardboard circle on top of the cotton balls & place the lid on the jar.
7. Keep the inside of the jar moisture free so insects won't discolor & replace the cotton & cardboard as needed.

Remember to recharge the jar periodically if insects do not seem to be dying as fast and never leave the lid off of your jar.

Pinning insects:

1. Hold the insects by its sides using your thumb & forefinger and firmly push the insect pin through the dorsal or top surface of the insect. The pin should be at a right angle to the insect's body.

- Beetles are pinned near the front margin of the right wing near the midline
- Grasshoppers are pinned to the right of the prothorax (The anterior division of the thorax of an insect, bearing the first pair of legs)
- True bugs are pinned to the right of the scutellum (A shield like bony plate or scale, as on the thorax of some insects)
- Butterflies, moths, dragonflies, & damselflies are pinned through the middle of the thorax (The second or middle region of the body of an arthropod, between the head and the abdomen, in insects bearing the true legs and wings.)
- Most other insects are pinned through the thorax to the right of the midline

2. Place insects on insect pins so their body is horizontal to the pinning surface or Styrofoam.

3. Gently push the insect within at least 25mm from the top of the pin so that you can pick up the pin without touching the insect. Make sure all pinned and card pointed insects in your collection are at the same height on the pin. Two labels will be added below the insect's body later.

4. Insects with extremely long legs like crane flies or curved antenna & abdomens like ichneumon wasps should be placed on their left side and pinned through the right side of their body in the area of the thorax.

It is always wise to pin insects the same day that you collect them because if they dry completely, then insect will fall apart!!

What do I do with insects too soft or too small to pin?

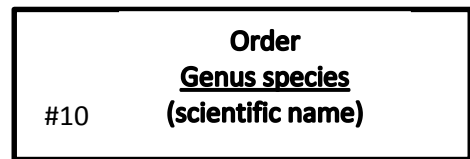
1. All soft bodied insects such as mayflies, stoneflies, & termites along with fleas must be kept permanently in preserving fluid in vials.
2. Use clear, glass vials or any substitute with tight fitting lids.
3. Place only one type of insect in each vial and add enough alcohol to cover the insect and the identification labels which will be place inside the vial.
4. Write vial labels under the vial on display.



Writing insect labels:

1. Each insect will have a label below the insect's body. The label will be the identification label
2. Obtain labels from cut index cards and use black ink only for writing the labels The identification label should have the order on the top line, scientific name on second line.
3. Place a number in the corner of the label to represent the # represented in your folder. (see folder below)
4. Place insects of the same order in numerical sequence.

Displaying insects:



It is not necessary to build an expensive case. Sturdy cases can be made out of 2 cardboard bottoms (1 for the lid) from cola cases painted nicely.

Name of student etc

1. All cases must be sturdy with a lid that can be easily opened for grading. Remember that the cases will be stacked when you turn them in to me!
2. If the collection has a clear lid, it must be made of plastic and not glass.
3. Place a sheet of Styrofoam in the bottom of your case.
4. Make a label from an unlined index card for the center of your case. This label should contain your full name, Pre-AP Biology, number of orders and number of insects in your collection. Use straight pins to attach this center card to the Styrofoam.
5. Spread out the labeled insects around this index card so there are no empty spots in your case. Place insects of the same order together in the display.
6. Make sure all identification labels on pins are readable.

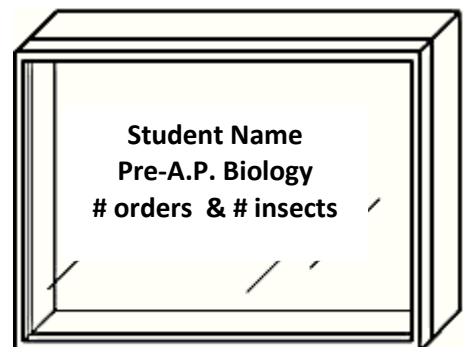


Figure 2: Collection display case.

Folder:

Include a folder that contains the following:

- Coversheet with name, Pre AP Biology Insect Collection, Summer 2014
- Include a table of contents with insects order and scientific name and page number
- Pictures of each displayed insect with url if from internet
- Order, Genus and species name. *Remember, the Genus is capitalized and the species name is in small letters. The Scientific Name is then underlined.*
- Common name for each insect
- Number the insects according to the numbers displayed in case
- Example of what each page may look like in the folder!

