



Idaho Entomology Handbook

Purpose:

The Entomology CDE introduces Idaho FFA members to the fundamentals of entomology and develops skills in identification of common insects and their relatives using taxonomy and nomenclature used by practitioners in the industry and in the scientific community. Understanding insects and key species is of utmost importance to agricultural crops and animal production, conservation, human and companion animal health and well-being.

The basic entomological principles to be covered include:

1. Insect structure and function
2. Metamorphosis
3. Insect identification
4. Importance to people

Objectives:

Students participating in the Entomology CDE should be able to:

1. Identify many beneficial and destructive insects and their close relatives.
2. Identify the class and order, type of metamorphosis, and type of mouthparts of insects.
3. Describe insect biology, behavior, and collection techniques.
4. Describe common pest control strategies.
5. Describe how to apply pesticides safely.

General Rules

1. A team will consist of three to four FFA members, with the top three individual scores counting toward team placing. Alternates will be allowed. Individuals FFA members may participate.
2. This State CDE will be held during the FFA State CDE's in Moscow.
3. Participants in need of special accommodations (disability or other health issues) must submit the Idaho State FFA Career Development Events Request for Special Accommodation Application found at the end of the General Rules and Regulations at least one month prior to the event.

Event Format:

1. Insect Identification
 - a. There will be 40 adult insect specimens chosen from the six insect relatives and 109 insect groups on the Insect Checklist (Form A).
 - b. Contestants will give the name of the species; the order; the type of metamorphosis; and the type of mouth parts.
 - c. Contestants will be allowed one (1) minute per insect to identify the insect.
 - d. Contestants will be allowed ten (10) minutes at the end of the rotation to go back and review any insects or complete their scantron sheets.
2. Insect Biology and Control Strategies Written Test

- a. A 25 question multiple-choice test.
- b. Test questions will be taken from the Texas FFA Entomology CDE Question Bank (2017-2021) available at: <https://www.texasffa.org/cde-entomology> (Sample Exam Key)

Event Scoring:

The event will use the Entomology scantron sheet (Form #527MO-2). A copy of the form is attached to these rules and is available from www.judgingcard.com (Missouri tab).

Event Component	Points
1. Insect Identification 40 specimens @ 10 points each Correct Name = 2.5 pts. Correct Order = 2.5 pts. Correct Metamorphosis type = 2.5 pts. Correct Mouthparts type = 2.5 pts.	400
2. Insect Biology and Control Strategies Written Test 25 multiple choice questions @ 4 pts. each	100
Total Points Possible	500

Equipment:

1. Two #2 sharpened pencils
2. Clipboard (recommended)
3. Magnifying glasses will be allowed but will NOT be provided

Event Rules and Regulations:

1. All written materials will be furnished by the CDE officials.
2. Contestants should bring two #2 sharpened pencils.
3. Scratch paper will be provided.
4. Contestants will NOT be allowed to touch or handle insect specimens.
5. Magnifying glasses will be allowed, but will NOT be provided.
6. Contestants will not be allowed to communicate with each other during the event.
7. Each contestant will be provided the Insect Identification List to complete the Insect Identification practicum.

References:

A Field Guide to Insects: America North of Mexico by Donald J. Borror and Richard E. White (1970). Houghton Mifflin Company, Boston (Peterson Field Guide Series).

The Practical Entomologist by Rick Imes. A Fireside Book. New York: Simon & Shuster.

Good Bug Bad Bug: Who's Who, What They Do, and How to Manage Them Organically (2nd ed.) by Jessica Walliser.

Pacific Northwest Insects (2018) by Merrill Peterson.

Destructive and Useful Insects: Their Habitat and Control (5th ed.) by Robert Metcalf. McGraw-Hills.

Introduction to Entomology – Student Reference (SR). Missouri Career Education. Free download from: <http://www.missouricareereducation.org/home.php>

Introduction to Entomology – Instructor Manual (IM). Missouri Career Education. Free download from: <http://www.missouricareereducation.org/home.php>

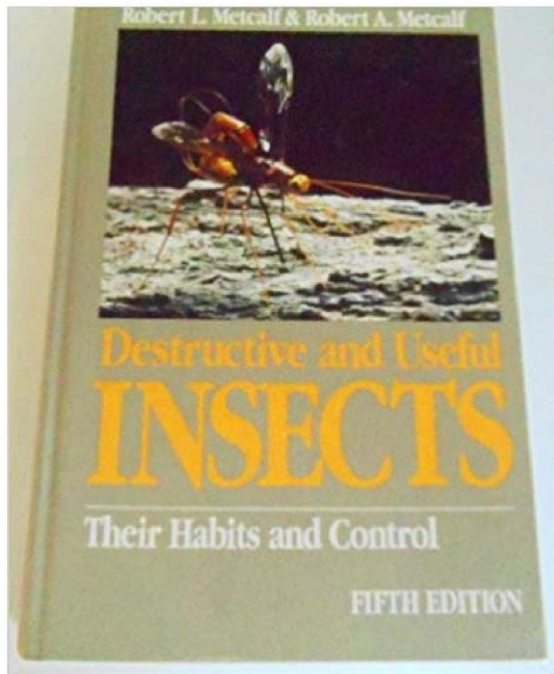
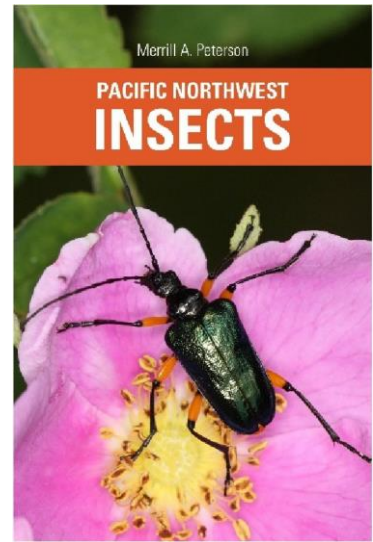
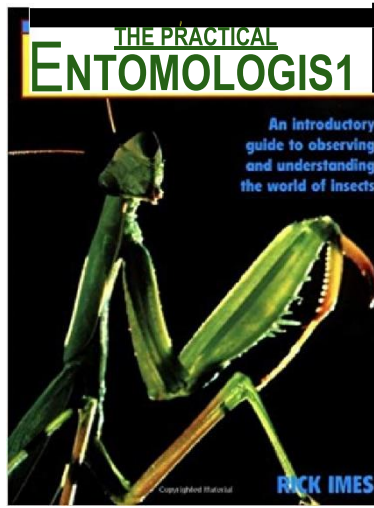
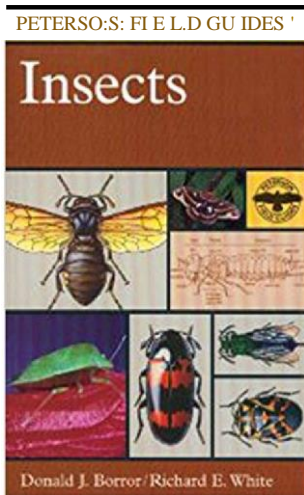
4-H Virtual Insect Collection. Department of Entomology and Plant Pathology – Oklahoma State University. <http://entopl.okstate.edu/4H-FFA/>

Study Materials for the Entomology Identification Contest Department of Entomology and Plant Pathology – Oklahoma State University. <http://entopl.okstate.edu/4H-FFA/ppt/guides.html>

Insect Images Library. University of Georgia's Center for Invasive Species and Ecosystem Health. <https://www.insectimages.org/>

Purdue Entomology CDE Resource Database. Purdue University. <https://extension.entm.purdue.edu/4h/default.php>

Purdue University Extension Entomology. Entomology Publications. <https://extension.entm.purdue.edu/complete.html>



Need to Know About the Insects In Yooc Gao-den

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'Who's Who, What They Do, and How to Manage Them Organically'

BAD BUG

Jessica Walliser
C.A. author of Grawle

Idaho FFA Entomology CDE - Insect Identification Checklist

	Insect	Order	Metamorphosis	Mouth Parts
001.	Alfalfa butterfly	Lepidoptera	Complete	Sucking
002.	Alfalfa weevil	Coleoptera	Complete	Chewing
003.	American cockroach	Blattodea	Simple	Chewing
004.	Ant	Hymenoptera	Complete	Chewing
005.	Aphid	Hemiptera	Simple	Sucking
006.	Assassin bug	Hemiptera	Simple	Sucking
007.	Bagworm larvae (in bag)	Lepidoptera	Complete	Chewing
008.	Bald-faced hornet	Hymenoptera	Complete	Chewing
009.	Bean leaf beetle	Coleoptera	Complete	Chewing
010.	Bed bug	Hemiptera	Simple	Sucking
011.	Black cutworm moth (adult)	Lepidoptera	Complete	Sucking
012.	Blister beetle	Coleoptera	Complete	Chewing
013.	Boll weevil	Coleoptera	Complete	Chewing
014.	Boxelder bug	Hemiptera	Simple	Sucking
015.	Brown stink bug	Hemiptera	Simple	Sucking
016.	Brown-banded cockroach	Blattodea	Simple	Chewing
017.	Buckeye butterfly	Lepidoptera	Complete	Sucking
018.	Bumble bee	Hymenoptera	Complete	Chewing
019.	Cabbage butterfly	Lepidoptera	Complete	Sucking
020.	Cabbage looper	Lepidoptera	Complete	Sucking
021.	Caddisfly	Trichoptera	Complete	Chewing
022.	Camel cricket	Orthoptera	Simple	Chewing
023.	Carpenter bee	Hymenoptera	Complete	Chewing
024.	Carpet beetle	Coleoptera	Complete	Chewing
025.	Carrion beetle	Coleoptera	Complete	Chewing
026.	Chinch bug	Hemiptera	Simple	Sucking
027.	Cicada	Hemiptera	Simple	Sucking
028.	Click beetle	Coleoptera	Complete	Chewing
029.	Codling moth	Lepidoptera	Complete	Sucking
030.	Colorado potato beetle	Coleoptera	Complete	Chewing
031.	Corn earworm moth (adult)	Lepidoptera	Complete	Sucking
032.	Damsel bug	Hemiptera	Simple	Sucking
033.	Damselfly	Odonata	Simple	Chewing
034.	Differential grasshopper (short-horned)	Orthoptera	Simple	Chewing
035.	Dobsonfly	Neuroptera	Complete	Chewing
036.	Dragonfly	Odonata	Simple	Chewing
037.	Earwig	Dermaptera	Simple	Chewing
038.	European corn borer moth	Lepidoptera	Complete	Sucking
039.	European hornet	Hymenoptera	Complete	Chewing
040.	Field cricket	Orthoptera	Simple	Chewing
041.	Flea	Siphonaptera	Complete	Sucking
042.	Flea beetle	Coleoptera	Complete	Chewing
043.	Flour beetle	Coleoptera	Complete	Chewing
044.	Forage looper moth (adult)	Lepidoptera	Complete	Sucking

	Insect	Order	Metamorphosis	Mouth Parts
045.	German cockroach	Blattodea	Simple	Chewing
046.	Giant water bug	Hemiptera	Simple	Sucking
047.	Green bottle fly	Diptera	Complete	Sucking
048.	Green June beetle	Coleoptera	Complete	Chewing
049.	Green lacewing	Neuroptera	Complete	Chewing
050.	Green stink bug	Hemiptera	Simple	Sucking
051.	Ground beetle	Coleoptera	Complete	Chewing
052.	Harlequin bug	Hemiptera	Simple	Sucking
053.	Hog louse	Anoplura	Simple	Sucking
054.	Honey bee	Hymenoptera	Complete	Chewing
055.	Horse fly	Diptera	Complete	Sucking
056.	House cricket	Orthoptera	Simple	Chewing
057.	House fly	Diptera	Complete	Sucking
058.	Inchneumon wasp	Hymenoptera	Complete	Chewing
059.	Indian meal moth (adult)	Lepidoptera	Complete	Sucking
060.	Japanese beetle	Coleoptera	Complete	Chewing
061.	June beetle	Coleoptera	Complete	Chewing
062.	Lace bug	Hemiptera	Simple	Sucking
063.	Ladybird beetle	Coleoptera	Complete	Chewing
064.	Leafhopper	Hemiptera	Simple	Sucking
065.	Lightningbug (firefly)	Coleoptera	Complete	Chewing
066.	Long-horned beetle	Coleoptera	Complete	Chewing
067.	Long-horned grasshopper	Orthoptera	Simple	Chewing
068.	Luna moth	Lepidoptera	Complete	Sucking
069.	Mayfly	Ephemeroptera	Simple	Chewing
070.	Mealybug	Hemiptera	Simple	Sucking
071.	Metallic wood-boring beetle	Coleoptera	Complete	Chewing
072.	Mexican bean beetle	Coleoptera	Complete	Chewing
073.	Minute pirate bug	Hemiptera	Simple	Chewing
074.	Mole cricket	Orthoptera	Simple	Chewing
075.	Monarch butterfly	Lepidoptera	Complete	Sucking
076.	Mosquito	Diptera	Complete	Sucking
077.	Moth fly	Diptera	Complete	Sucking
078.	Mud dauber wasp	Hymenoptera	Complete	Chewing
079.	Northern corn rootworm (adult)	Coleoptera	Complete	Chewing
080.	Oriental cockroach	Blattodea	Simple	Chewing
081.	Paper wasp	Hymenoptera	Complete	Chewing
082.	Peachtree borer moth	Lepidoptera	Complete	Sucking
083.	Pennsylvania wood cockroach	Blattodea	Simple	Chewing
084.	Praying mantis	Mantodea	Simple	Chewing
085.	Red-legged grasshopper	Orthoptera	Simple	Chewing
086.	Rice weevil	Coleoptera	Complete	Chewing
087.	Robber fly	Diptera	Complete	Sucking
088.	Rove beetle	Coleoptera	Complete	Chewing
089.	Saw-toothed grain beetle	Coleoptera	Complete	Chewing

	Insect	Order	Metamorphosis	Mouth Parts
090.	Scorpionfly	Mecoptera	Complete	Chewing
091.	Soldier beetle	Coleoptera	Complete	Chewing
092.	Southern corn rootworm (adult) (Spotted cucumber beetle)	Coleoptera	Complete	Chewing
093.	Squash bug	Hemiptera	Simple	Sucking
094.	Stonefly	Plecoptera	Simple	Chewing
095.	Syrphid fly (Flower fly)	Diptera	Complete	Sucking
096.	Tachinid fly	Diptera	Complete	Sucking
097.	Tarnished plant bug	Hemiptera	Simple	Sucking
098.	Tent caterpillar moth	Lepidoptera	Complete	Sucking
099.	Termite	Isoptera	Simple	Chewing
100.	Tiger beetle	Coleoptera	Complete	Chewing
101.	Tiger moth	Lepidoptera	Complete	Sucking
102.	Tiger swallowtail butterfly	Lepidoptera	Complete	Sucking
103.	Tobacco hornworm moth (adult)	Lepidoptera	Complete	Sucking
104.	Treehopper	Hemiptera	Simple	Sucking
105.	True armyworm moth (adult)	Lepidoptera	Complete	Sucking
106.	Underwing moth	Lepidoptera	Complete	Sucking
107.	Velvet ant	Hymenoptera	Complete	Chewing
108.	Viceroy butterfly	Lepidoptera	Complete	Sucking
109.	Walking stick	Phasmatodea	Simple	Chewing
110.	Water strider	Hemiptera	Simple	Sucking
111.	Western corn rootworm	Coleoptera	Complete	Chewing
112.	White-lined sphinx	Lepidoptera	Complete	Sucking
113.	Yellowjacket	Hymenoptera	Complete	Chewing

Idaho FFA Entomology CDE - Insect Identification List

01. Alfalfa butterfly	41. Flea	79. Northern corn rootworm (adult)
02. Alfalfa weevil	42. Flea beetle	80. Oriental cockroach
03. American cockroach	43. Flour beetle	81. Paper wasp
04. Ant	44. Forage looper moth (adult)	82. Peachtree borer moth
05. Aphid	45. German cockroach	83. Pennsylvania wood cockroach
06. Assassin bug	46. Giant water bug	84. Praying mantis
07. Bagworm larvae (in bag)	47. Green bottle fly	85. Red-legged grasshopper
08. Bald-faced hornet	48. Green June beetle	86. Rice weevil
09. Bean leaf beetle	49. Green lacewing	87. Robber fly
10. Bed bug	50. Green stink bug	88. Rove beetle
11. Black cutworm moth (adult)	51. Ground beetle	89. Saw-toothed grain beetle
12. Blister beetle	52. Harlequin bug	90. Scorpionfly
13. Boll weevil	53. Hog louse	91. Soldier beetle
14. Boxelder bug	54. Honey bee	92. Southern corn rootworm (adult)
15. Brown stink bug	55. Horse fly	93. Squash bug
16. Brown-banded cockroach	56. House cricket	94. Stonefly
17. Buckeye butterfly	57. House fly	95. Syrphid fly (Flower Fly)
18. Bumble bee	58. Ichneumon wasp	96. Tachinid fly
19. Cabbage butterfly	59. Indian meal moth (adult)	97. Tarnished plant bug
20. Cabbage looper	60. Japanese beetle	98. Tent caterpillar moth
21. Caddisfly	61. June beetle	99. Termite
22. Camel cricket	62. Lace bug	100. Tiger beetle
23. Carpenter bee	63. Ladybird beetle	101. Tiger moth
24. Carpet beetle	64. Leafhopper	102. Tiger swallowtail butterfly
25. Carrion beetle	65. Lightning bug (Firefly)	103. Tobacco hornworm moth (adult)
26. Chinch bug	66. Long-horned beetle	104. Treehopper
27. Cicada	67. Long-horned grasshopper	105. True armyworm moth (adult)
28. Click beetle	68. Luna moth	106. Underwing moth
29. Codling moth	69. Mayfly	107. Velvet ant
30. Colorado potato beetle	70. Mealybug	108. Viceroy butterfly
31. Corn earworm moth (adult)	71. Metallic wood-boring beetle	109. Walkingstick
32. Damsel bug	72. Mexican bean beetle	110. Water strider
33. Damselfly	73. Minute pirate bug	111. Western corn rootworm (adult)
34. Differential grasshopper (Short-horned)	74. Mole cricket	112. White-lined sphinx
35. Dobsonfly	75. Monarch butterfly	113. Yellowjacket
36. Dragonfly	76. Mosquito	
37. Earwig	77. Moth fly	
38. European corn borer moth (adult)	78. Mud dauber wasp	
39. European hornet		
40. Field cricket		

INSECT ORDERS			METAMORPHOSIS
01. Anoplura	08. Hymenoptera	15. Orthoptera	S = Simple
02. Blattodea	09. Isoptera	16. Phasmatodea	C = Complete
03. Coleoptera	10. Lepidoptera	17. Plecoptera	MOUTH PARTS
04. Dermaptera	11. Mantodea	18. Siphonaptera	S = Sucking
05. Diptera	12. Mecoptera	19. Trichoptera	C = Chewing
06. Ephemeroptera	13. Neuroptera		
07. Hemiptera	14. Odonata		

