

ENTOMOLOGY

CAREER DEVELOPMENT EVENT

Purpose

Insects are extremely important animals; some are very destructive and many are beneficial. Insects may damage or kill cultivated plants, they may damage or contaminate stored foods and other products, and they may attack man or animals and bite, sting, or act as vectors of disease. Insects can be beneficial for pollination of crops, parasites and predators of destructive species. They are also important as food for birds, fish and other animals, and provide products of commercial value such as honey, wax, silk, and shellac. It is important that FFA members be able to recognize some of the more important beneficial and destructive species of insects and their relatives. In addition to proper identification of the pest, it is important to be aware of control strategies and know how to properly apply pesticides safely should chemical control be required.

Objectives

Students participating in this CDE should be able to:

- I. Identify many beneficial and destructive insects and their close relatives.
- II. Identify the class and order, type of metamorphosis, type of mouthparts, and understand common pest control strategies.
- III. Understand how to apply pesticides safely.
- IV. Understand insect biology, behavior, and collection techniques.

ENTOMOLOGY
CAREER DEVELOPMENT EVENT

Crosswalk with
 Show-Me Standards

Objectives – Students participating in the Career Development Event should be able to:		Show-Me Standards	
		Knowledge Standards (Content Areas)	Performance Standards (Goals)
1.	Identify many beneficial and destructive insects and their close relatives.	MA.1, MA.2	1.5, 1.10
2.	Identify the class and order, type of metamorphosis, type of mouthparts, and understand common pest control strategies.	SC.3, SC.4, SC.8 HP.3, HP.6, HP.7	3.1, 3.5, 3.8 4.4, 4.7, 4.8
3.	Understand how to apply pesticides safely.		
4.	Understand insect biology, behavior, and collection techniques.		

CORRESPONDING SECONDARY AGRICULTURE CURRICULUM

Course and/or Curriculum:	Agricultural Science II Greenhouse Operation and Management	Unit(s): Entomology Plant Science - Lesson 4 Crop Science - Lesson 9 Unit VI – Plant Health
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Event Format and Scoring

Each team will consist of four (4) members. Each team member must participate in all phases of the CDE.

Part I. Insect Identification. There will be forty (40) adult specimens chosen from the six insect relatives and one hundred (100) insect groups on the Insect Identification List. The contestant will give the name of the specimens; the order; the type of metamorphosis; and the type of mouthparts. The event will be scored as follows for each specimen:

Correct Name	2 points
Correct Order	2 points
Correct Type of Metamorphosis	2 points
Correct Type of Mouthparts	2 points

A maximum of 320 points for identification is possible.

Part II. Insect Biology and Control Strategies. The Pesticide Application Quiz will consist of 75 true/false and multiple choice questions taken directly from Unit 1, 4, and 5 of the study manual, "Applying Pesticides Correctly" and the book The Practical Entomologist. Each question will be worth two points for a maximum of 150 points for the Pesticide Application Quiz.

Event Rules

1. Contestant will be allowed 45 seconds to identify each insect and 50 minutes to complete the pesticide application quiz.
2. Written Materials: All written materials will be furnished for the CDE. Contestants should provide pencils and clean clipboards. Scratch paper will be provided. Calculators may be used when the CDE specifies calculators may be used. In all events calculators must be **nonprogrammable** and **non-graphing** models and limited to the following function keys or their equivalent: Plus (+); Minus (-); Multiplication (x); Division (/); Equals (=); Memory Clear (MRC); Memory Minus (M-); Memory Plus(M+); Plus &/or Minus (+/-); Percentage (%); Square Root or Square Keys. Additional Function Keys may be accepted if approved in advance by the CDE Superintendent. The main criteria is that the calculator be **nonprogrammable** & **non-graphing** and that equations &/or text may not be stored within the calculators memory.
3. Contestants will not be able to touch or handle insect specimens. Magnifying glasses will be allowed but will not be provided.
4. All contestants will be given a number by which they will be identified throughout the event.
5. All contestants must be prompt at their stations throughout the event. No provisions will be made for tardiness and will most certainly cause late contestants to lose event points.

6. Contestants will not communicate with each other while the CDE is in progress.
7. CDE booklet will not be returned to contestants after tests.
8. Official FFA Entomology Insect Identification List will be provided to each contestant.
9. Form 50 (refer to following pages) will be used for scoring I.D.

References

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

Applying Pesticides Correctly (MX328-revised 01/97) Units 1, 4, & 5. (a.k.a. the "White" book). U.S. Department of Agriculture and U.S. Environmental Protection Agency (a guide for private and commercial applicators).

Color slides. A complete set of slides (99) showing all the insects to be identified in the Entomology CDE.

Entomology Unit for Ag. Science II (Instructor and Student Reference).

Above materials available from: Instructional Materials Laboratory, 1400 Rock Quarry Rd. Q156, University of Missouri, Columbia, MO 65202

The Practical Entomologist, Rick Imes, A Fireside Book. Published by Simon & Schuster, New York.

FFA INSECT CHECKLIST

	<u>Insect</u>	<u>Order</u>	<u>Metamorphosis</u>	<u>Mouth Parts</u>
1.	Alfalfa butterfly	Lepidoptera	Complete	Sucking
2.	Alfalfa weevil	Coleoptera	Complete	Chewing
3.	American cockroach	Blattodea	Simple	Chewing
4.	Ant	Hymenoptera	Complete	Chewing
5.	Assassin bug	Hemiptera	Simple	Sucking
6.	Bagworm larvae (in bag)	Lepidoptera	Complete	Chewing
7.	Bald-faced hornet	Hymenoptera	Complete	Chewing
8.	Bean leaf beetle	Coleoptera	Complete	Chewing
9.	Black cutworm moth	Lepidoptera	Complete	Sucking
10.	Blister beetle	Coleoptera	Complete	Chewing
11.	Boll weevil	Coleoptera	Complete	Chewing
12.	Boxelder bug	Hemiptera	Simple	Sucking
13.	Brown stink bug	Hemiptera	Simple	Sucking
14.	Brown-banded cockroach	Blattodea	Simple	Chewing
15.	Buckeye butterfly	Lepidoptera	Complete	Sucking
16.	Bumble bee	Hymenoptera	Complete	Chewing
17.	Cabbage butterfly	Lepidoptera	Complete	Sucking
18.	Cabbage looper	Lepidoptera	Complete	Sucking
19.	Caddisfly	Trichoptera	Complete	Chewing
20.	Camel cricket	Orthoptera	Simple	Chewing
21.	Carpenter bee	Hymenoptera	Complete	Chewing
22.	Carpet beetle	Coleoptera	Complete	Chewing
23.	Carrion beetle	Coleoptera	Complete	Chewing
24.	Chinch bug	Hemiptera	Simple	Sucking
25.	Cicada	Homoptera	Simple	Sucking
26.	Click beetle	Coleoptera	Complete	Chewing
27.	Codling moth	Lepidoptera	Complete	Sucking
28.	Colorado potato beetle	Coleoptera	Complete	Chewing
29.	Corn earworm moth	Lepidoptera	Complete	Sucking

	<u>Insect</u>	<u>Order</u>	<u>Metamorphosis</u>	<u>Mouth Parts</u>
30.	Damsel bug	Hemiptera	Simple	Sucking
31.	Damselfly	Odonata	Simple	Chewing
32.	Differential grasshopper (short-horned)	Orthoptera	Simple	Chewing
33.	Dobsonfly	Neuroptera	Complete	Chewing
34.	Dragonfly	Odonata	Simple	Chewing
35.	Earwig	Dermaptera	Simple	Chewing
36.	Elm leaf beetle	Coleoptera	Complete	Chewing
37.	European corn borer moth	Lepidoptera	Complete	Sucking
38.	Field cricket	Orthoptera	Simple	Chewing
39.	Flea	Siphonaptera	Complete	Sucking
40.	Flea beetle	Coleoptera	Complete	Chewing
41.	Flour beetle	Coleoptera	Complete	Chewing
42.	Forage looper moth	Lepidoptera	Complete	Sucking
43.	German cockroach	Blattodea	Simple	Chewing
44.	Giant water bug	Hemiptera	Simple	Sucking
45.	Green bottle fly	Diptera	Complete	Sucking
46.	Green June beetle	Coleoptera	Complete	Chewing
47.	Green lacewing	Neuroptera	Complete	Chewing
48.	Green stink bug	Hemiptera	Simple	Sucking
49.	Ground beetle	Coleoptera	Complete	Chewing
50.	Harlequin bug	Hemiptera	Simple	Sucking
51.	Hog louse	Anoplura	Simple	Sucking
52.	Honey bee	Hymenoptera	Complete	Chewing
53.	Horntail	Hymenoptera	Complete	Chewing
54.	Horse fly	Diptera	Complete	Sucking
55.	House fly	Diptera	Complete	Sucking
56.	Ichneumon wasp	Hymenoptera	Complete	Chewing
57.	Indian meal moth	Lepidoptera	Complete	Sucking
58.	Japanese beetle	Coleoptera	Complete	Chewing
59.	Lace bug	Hemiptera	Simple	Sucking

	<u>Insect</u>	<u>Order</u>	<u>Metamorphosis</u>	<u>Mouth Parts</u>
60.	Ladybird beetle	Coleoptera	Complete	Chewing
61.	Leafhopper	Homoptera	Simple	Sucking
62.	Lightningbug (firefly)	Coleoptera	Complete	Chewing
63.	Long-horned beetle	Coleoptera	Complete	Chewing
64.	Long-horned grasshopper	Orthoptera	Simple	Chewing
65.	Luna moth	Lepidoptera	Complete	Sucking
66.	Mayfly	Ephemeroptera	Simple	Chewing
67.	Mealybug	Homoptera	Simple	Sucking
68.	Metallic wood-boring beetle	Coleoptera	Complete	Chewing
69.	Mexican bean beetle	Coleoptera	Complete	Chewing
70.	Minute pirate bug	Hemiptera	Simple	Sucking
71.	Mole cricket	Orthoptera	Simple	Chewing
72.	Monarch butterfly	Lepidoptera	Complete	Sucking
73.	Mosquito	Diptera	Complete	Sucking
74.	Moth fly	Diptera	Complete	Sucking
75.	Mud dauber wasp	Hymenoptera	Complete	Chewing
76.	Northern corn rootworm	Coleoptera	Complete	Chewing
77.	Oriental cockroach	Blattodea	Simple	Chewing
78.	Peachtree borer moth	Lepidoptera	Complete	Sucking
79.	Pennsylvania wood cockroach	Blattodea	Simple	Chewing
80.	Praying mantid	Mantodea	Simple	Chewing
81.	Red-legged grasshopper	Orthoptera	Simple	Chewing
82.	Rice weevil	Coleoptera	Complete	Chewing
83.	Robber fly	Diptera	Complete	Sucking
84.	Rove beetle	Coleoptera	Complete	Chewing
85.	Saw-toothed grain beetle	Coleoptera	Complete	Chewing
86.	Scorpionfly	Mecoptera	Complete	Chewing
87.	Soldier beetle	Coleoptera	Complete	Chewing
88.	Southern corn rootworm (Spotted cucumber beetle)	Coleoptera	Complete	Chewing
89.	Squash bug	Hemiptera	Simple	Sucking

	<u>Insect</u>	<u>Order</u>	<u>Metamorphosis</u>	<u>Mouth Parts</u>
90.	Stonefly	Plecoptera	Simple	Chewing
91.	Syrphid fly (Flower fly)	Diptera	Complete	Sucking
92.	Tachinid fly	Diptera	Complete	Sucking
93.	Tarnished plant bug	Hemiptera	Simple	Sucking
94.	Tent caterpillar moth	Lepidoptera	Complete	Sucking
95.	Termite	Isoptera	Simple	Chewing
96.	Tiger beetle	Coleoptera	Complete	Chewing
97.	Tiger moth	Lepidoptera	Complete	Sucking
98.	Tiger swallowtail butterfly	Lepidoptera	Complete	Sucking
99.	Tobacco hornworm moth	Lepidoptera	Complete	Sucking
100.	Treehopper	Homoptera	Simple	Sucking
101.	True armyworm moth	Lepidoptera	Complete	Sucking
102.	Underwing moth	Lepidoptera	Complete	Sucking
103.	Velvet ant	Hymenoptera	Complete	Chewing
104.	Viceroy butterfly	Lepidoptera	Complete	Sucking
105.	Walking stick	Phasmatodea	Simple	Chewing
106.	Water strider	Hemiptera	Simple	Sucking
107.	Western corn rootworm	Coleoptera	Complete	Chewing
108.	White-lined sphinx	Lepidoptera	Complete	Sucking
109.	Yellowjacket	Hymenoptera	Complete	Chewing

**FFA Entomology CDE
Insect Identification List**

FORM 50B

COMMON NAME

- | | | |
|--|---------------------------------|---|
| 1. Alfalfa butterfly | 37. European corn borer moth | 74. Moth fly |
| 2. Alfalfa weevil | 38. Field cricket | 75. Mud dauber wasp |
| 3. American cockroach | 39. Flea | 76. Northern corn rootworm |
| 4. Ant | 40. Flea beetle | 77. Oriental cockroach |
| 5. Assassin bug | 41. Flour beetle | 78. Peachtree borer moth |
| 6. Bagworm larvae (in bag) | 42. Forage looper moth | 79. Pennsylvania wood cockroach |
| 7. Bald-faced hornet | 43. German cockroach | 80. Praying mantis |
| 8. Bean leaf beetle | 44. Giant water bug | 81. Red-legged grasshopper |
| 9. Black cutworm moth | 45. Green bottle fly | 82. Rice weevil |
| 10. Blister beetle | 46. Green June beetle | 83. Robber fly |
| 11. Boll weevil | 47. Green lacewing | 84. Rove beetle |
| 12. Boxelder bug | 48. Green stink bug | 85. Saw-toothed grain beetle |
| 13. Brown stink bug | 49. Ground beetle | 86. Scorpionfly |
| 14. Brown-banded cockroach | 50. Harlequin bug | 87. Soldier beetle |
| 15. Buckeye butterfly | 51. Hog louse | 88. Southern corn rootworm
(Spotted cucumber beetle) |
| 16. Bumble bee | 52. Honey bee | 89. Squash bug |
| 17. Cabbage butterfly | 53. Horntail | 90. Stonefly |
| 18. Cabbage looper | 54. Horse fly | 91. Syrphid fly (Flower fly) |
| 19. Caddisfly | 55. House fly | 92. Tachinid fly |
| 20. Camel cricket | 56. Ichneumon wasp | 93. Tarnished plant bug |
| 21. Carpenter bee | 57. Indian meal moth | 94. Tent caterpillar moth |
| 22. Carpet beetle | 58. Japanese beetle | 95. Termite |
| 23. Carrion beetle | 59. Lace bug | 96. Tiger beetle |
| 24. Chinch bug | 60. Ladybird beetle | 97. Tiger moth |
| 25. Cicada | 61. Leafhopper | 98. Tiger swallowtail butterfly |
| 26. Click beetle | 62. Lightningbug (Firefly) | 99. Tobacco hornworm moth |
| 27. Codling moth | 63. Long-horned beetle | 100. Treehopper |
| 28. Colorado potato beetle | 64. Long-horned grasshopper | 101. True armyworm moth |
| 29. Corn earworm moth | 65. Luna moth | 102. Underwing moth |
| 30. Damsel bug | 66. Mayfly | 103. Velvet ant |
| 31. Damselfly | 67. Mealybug | 104. Viceroy butterfly |
| 32. Differential grasshopper
(Short-horned) | 68. Metallic wood-boring beetle | 105. Walkingstick |
| 33. Dobsonfly | 69. Mexican bean beetle | 106. Water strider |
| 34. Dragonfly | 70. Minute pirate bug | 107. Western corn rootworm |
| 35. Earwig | 71. Mole cricket | 108. White-lined sphinx |
| 36. Elm leaf beetle | 72. Monarch butterfly | 109. Yellowjacket |
| | 73. Mosquito | |

INSECT ORDERS			METAMORPHOSIS
A. Anoplura	H. Homoptera	O. Odonata	Simple Complete
B. Blattodea	I. Hymenoptera	P. Orthoptera	
C. Coleoptera	J. Isoptera	Q. Phasmatodea	MOUTH PARTS
D. Dermaptera	K. Lepidoptera	R. Plecoptera	Sucking Chewing
E. Diptera	L. Mantodea	S. Siphonaptera	
F. Ephemeroptera	M. Mecoptera	T. Trichoptera	
G. Hemiptera	N. Neuroptera		

Name: _____ Contestant No: _____ School: _____

Directions: Enter the correct Common Name number and Order letter in the appropriate column. Darken the circle of the correct Metamorphosis and Mouth Parts letter in the appropriate column (make all entries LEGIBLE).

Common Name Number	Order	Metamorphosis		Mouth Parts		Common Name Number	Order	Metamorphosis		Mouth Parts	
		Simple	Complete	Sucking	Chewing			Simple	Complete	Sucking	Chewing
		S	C	S	C			S	C	S	C
1.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	21.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	22.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	23.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	24.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	25.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	26.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	27.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	28.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	29.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	30.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	31.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	32.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	33.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	34.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	35.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	36.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	37.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	38.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	39.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	40.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>