

4-H Entomology Project

Entomology is the study of insects. This 4-H project will help you learn about insects, how they live and their importance. You will also learn about other animals and plants and the earth. You will learn many things about nature that will make your life more interesting and perhaps find a career in entomology.



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MATERIALS:

This Oregon 4-H Entomology Project (outline)	4-H 3220
4-H Entomology Project (manual)	4-H 3221
4-H Natural Science Record	4-H 301R

ANNUAL REQUIREMENTS: (do all of these each year)

1. Make at least one item of entomology equipment such as a net, killing jar, display or storage case, or spreading board.
2. Collect, identify and label at least 10 species of insects. Beginners should collect one insect from each of 10 different Orders. Advanced members should collect more insects, but may specialize in certain groups such as aquatic or immature insects or life histories.
3. Undertake the control of one harmful insect (under supervision of parent or club leader) or study and report on the control of one insect.
4. Learn about and report on the life history of at least one insect.
5. Observe five different insects in their natural habitat, learn as much as you can about them--what they eat, where they rest, how they reproduce--and report to your club or parents.
6. Complete a 4-H Natural Science Record.
7. Advance as far as you can in the 4-H Entomology Advancement Program.

Cooperative Extension work in Agriculture and Home Economics, Joseph R. Cox, acting director, Oregon State University and the United States Department of Agriculture cooperating. Printed and distributed in furtherance of Acts of Congress of May 8 and June 30, 1914.

4-H ENTOMOLOGY IDENTIFICATION CONTESTS

Insect identification contests will help you learn the names of many of the insects in your neighborhood. When you have learned the names and characteristics of the Orders, you will be able to identify any insect, anywhere, to Order.

Learn the Orders and the common names for each Order as listed in the 4-H Entomology Project Manual, page 8. As you advance in 4-H Entomology, you will become familiar with many specific common names such as Japanese beetle, pea leaf weevil and ten-lined June beetle. All bugs and beetles are insects but not all insects are bugs or beetles.

Insects used in 4-H identification contests are those found anywhere in the state. There may be specimens you have never seen before but if you know the Orders, you will be able to identify them to Order and common name. On pages 3-6 is a list of common Orders of insects found in Oregon along with examples of insects within each Order.

The junior contests will include the more common insects. The senior contest will have more specimens and include some that are not so common.

CONTEST RULES

1. Be on time, have a pencil, listen carefully and follow instructions.
2. Do not talk with anyone during the contest. If a question arises that cannot wait until after the contest, ask the person in charge.
3. Do your own work and don't allow others to see your answers.
4. Do not touch pinned specimens. Pinned insects are fragile, breaking them can ruin a contest.
5. Write neatly and spell correctly.
6. When you have finished the contest, take your paper to the person in charge and wait quietly until all others have finished.

SCORING

	<u>Order</u>	<u>Common name</u>	<u>Total</u>
1. Three points for each correct name, spelled correctly.	Orthoptera (3)	Grasshopper (3)	6
2. Two points for correct names.	Orthoptera (2)	Grashoper (2)	4
3. No points for incorrect names, illegible writing, misspelled partial name, or left blank.	Hemiptera (0)	hopper (0)	0

STUDY HELPS

Your 4-H Entomology Project manual has a Key to Order of Insects that will help you learn to identify them.

HOW TO KNOW THE INSECTS, H. E. Jaques. Wm. Brown Co., 1947, 209p., \$2.25.
VEGETABLE GARDEN INSECT PESTS, OSU EB 747, Rev. 1970, 12p, CES.

A PARTIAL LIST OF COMMON OREGON INSECTS

Order *Protura* -- minute, whitish in color living in moist soil and humus.

Order *Thysanura* -- The bristletails, found in rotten wood.

Examples: Silverfish)
Firebrats) -- Both found in homes.

Order *Collembola* -- the springtails, most have a jumping organ, are very small, found under bark, in moist situations.

Order *Ephemeroptera* -- the mayflies, elongate soft-bodied with 2 or 3 threadlike tails. Aquatic, emerging in huge numbers, at times.

Order *Odonata* -- dragonflies and damselflies.

Order *Orthoptera* -- Examples:

Grasshoppers	Cockroaches--
Katydids	American
Mantids	Oriental
Walking sticks	German
	brown banded



Order *Isoptera* -- the termites.

Examples: Dampwood Subterranean

Order *Plecoptera* -- the stoneflies.

Examples:

Giant stoneflies	Roach-like stoneflies
Winter stoneflies	Spring stoneflies
Green wing stoneflies	

Order *Dermoptera* -- the earwigs (European earwig).

Order *Psocoptera* -- the psocids..

Examples: Book "lice" Bark "lice"



Order *Mallophaga* -- chewing lice.

Examples:

Chicken louse	Dog biting louse	Horse biting louse
Chicken head louse	Shaft louse	Many other biting lice
Cattle biting louse	Turkey louse	on birds and mammals

Order *Anoplura* -- sucking lice. Parasites of mammals, including species on: horses, cattle, hogs, sheep and man.

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(Common Oregon Insects, continued)

Order *Thysanoptera* -- thrips.

Examples:

Flower thrips
Onion thrips

Prune thrips
Pear thrips

Gladiolus thrips
Greenhouse thrips

Order *Hemiptera* -- true bugs.

Examples:

Aquatic

Water boatman
Backswimmers
Water scorpions
Giant water bugs
Creeping water bugs
Toad bugs
Water striders
Water measurers

Terrestrial (pests)

Bed bugs (predatory)
Plant bugs
Flower bugs
Lace bugs
Chinch bugs
Grass bugs
Stinkbugs
Negro bugs
Squash bugs
Stainers
Ambush bugs
Assassin bugs
Damsel bugs

Order *Homoptera* -- Examples:

Cicadas
Treehoppers
Leafhoppers

Spittlebugs
Psyllids
Aphids

White flies
Scales
Mealybugs
Lygus bugs

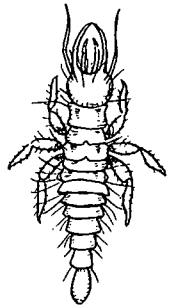
Order *Neuroptera* -- the nerve-winged insects.

Examples:

Fishflies
Dobsonflies

Alderflies
Snakeflies

Lacewings
Mantidflies
Antlion



Order *Coleoptera* -- the beetles.

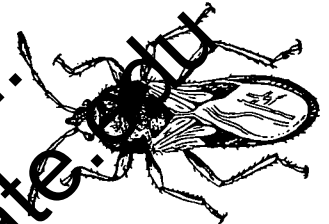
Examples:

Tiger beetles
Ant like flower beetles
Stag beetles
Rove beetles
Wharfbug beetles
Hairy fungus beetles
Scarab beetles
Soldier beetles
Strawberry root weevils
Fungus beetles
Pea leaf weevils
Carion beetles
Flat bark beetles

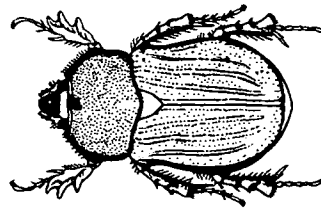
Ground beetles
Blister beetles
Long-horned wood borers
Fireflies
Sap beetles
Darkling beetles
Crawling water beetles
Skin beetles
Bean weevils
Checkered beetles
Seed beetles
Flower beetles
Wireworms

Flat grain beetles
Spider beetles
Predaceous diving beetles
Bark beetles
Ladybird beetles
Powder-post beetles
Water scavenger beetles
Ambrosia beetles
Hister beetles
Metallic wood-borers
Pea weevils
Click beetles

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(Common Oregon Insects --
Coleoptera, Continued)



Leaf beetles---
asparagus beetles
spotted cucumber beetles
potato beetles --
Colorado potato beetle

spotted cucumber beetles
flea beetles --
tuber
cabbage
potato

Order *Mecoptera* -- scorpion flies. Few species; uncommon except in a few locations.

Order *Trichoptera* -- caddisflies (aquatic).

Examples:

Primitive caddisflies	Finger-net caddisflies
Net-spinning caddisflies	Snail-case caddisflies

Order *Lepidoptera* -- butterflies, moths, skippers.

Examples:

Parnassians	Cabbage	Sulfurs
Orange-tips	Monarch	Wood-nymphs
Variegated cutworm	Western bean cutworm	Corn earworm
Clothes moth	Tiger	Cabbage looper
Noctuids	Brush-footed	Blues, coppers, hair-
Cutworm	Fritillaries	streaks
Tussock	Checker-spots	Swallowtails
Measuringworm	Angle-wings, mourning-	Sphinx
Saddle back	cloaks	Hawk
Clear-wing	Admirals	Hornworm
Ctenuchas	Beet armyworm	Black cutworm
Underwing	Owlet	Tent caterpillar
Cankerworm		

Order *Diptera* -- the flies.

Examples:

Craeflies	Horse flies	Bee flies
Mosquitoes	Syrphid flies	Fruit flies
Gall midges	House flies	Face flies
Blow flies	Flesh flies	Spinach leaf miners
Biting midges	March flies	Robber flies
Dier flies	Tachinid flies	Picture-winged flies
Leaf-miner flies	Stable flies	Horn flies
Horse bot flies	Warble and bot flies	



Order *Siphonaptera* -- the fleas.

Examples:

Rodent fleas	Bat fleas
Cat fleas	Dog fleas



Order *Hymenoptera* -- the bees, ants, wasps, etc.

Examples

Sawflies	Spider wasps	Cuckoo wasps
Ichneumons	Leafcutting bees	Ants
Gall wasps	Bumblebees	Paper wasps
Velvet ants	Horntails	Honeybees
Vespid wasps	Chalcids	Carpenter bees

EXHIBITS

Exhibits are an important part of the 4-H Entomology project, but are not required. You will learn a great deal while preparing an exhibit or display and can show others what you have learned. 4-H members may exhibit in any or all three of the following classes: Insect Collections, Science Displays or Conservation Exhibits.

INSECT COLLECTIONS

Insects should be mounted as explained in your 4-H Entomology Project manual.

Labels should be printed with a sharp pencil or black ink on white unlined card stock (like index cards). Labels should be as small as can be managed and of uniform size. Information on the labels should include:

- Location -- city or permanent landmark and state
- Date, including year
- Host Plant or Animal, if known
- Name or collector

Amity, Ore.
2-12-70
on peach
Andy Wilson

Order and common name

Plecoptera
Stonefly

At least 10 of the insects included must have been collected by the exhibitor in the current 4-H year. Others may have been collected in previous years or traded for or purchased.

Entomology exhibits for 4-H fairs must meet the following qualifications. (Displays for store windows, school displays, meetings and other uses need not be limited by these requirements.)

Each exhibit or display case should be labeled as follows:

Name Andy Wilson Year Born 1961 Year in 4-H Entomology 1

Address Route 1, Box 42, Amity, Oregon County Yamhill

Club Honeybee Hoppers Box 1 of 1

Leader George Martin

Exhibit Classes

1. *Junior (9, 10, & 11 years) 10 to 20 mounted insects representing at least 10 Orders.
2. *Intermediate (12, 13 & 14) 15 to 20 insects representing at least 12 Orders.
3. *Senior (15 to 19) Specialized collections and/or life histories not to exceed 50 specimens.

* Age as of previous December 31.

Display cases should be flat with a transparent cover or with a lid that can be opened, like a cigar box; junior exhibit cases should not exceed 12 inches from front to back. No exhibit case should exceed 18 inches from front to back or 24 inches in width. If more room is needed, use two cases.

Basis for Scoring

Correct number of insects, species, orders, etc., as specified above.

Condition of insects -- no missing or broken parts; properly shaped and mounted.

Labels -- complete, correct identification to Order, legible.

General appearance -- attractive and neat.

SCIENCE DISPLAYS

An entomology science display should visually explain some physical or biological process related to insects such as how insects find their way or find their mates, how they communicate, a life history display, how beneficial insects help man, how different insects eat, how insects live through the winter or how insects differ from other animals. You can think of many other interesting topics for a science display.

The display should be attractive and interesting, tell a story, be adequately explained and be neat, orderly and well constructed. Written material should be kept to a minimum. The average viewer will not spend more than a very few minutes at any exhibit.

A science display for 4-H fairs must not be more than 24 inches deep (front to back), 30 inches wide and 24 inches high unless it can rest on the floor.

4-H Entomology Displays are also excellent for Science Fairs. Displays that include research leading to conclusions are desired at Science Fairs.

Classes for 4-H Science Displays at county and state fairs: Junior, Intermediate and Senior.

CONSERVATION EXHIBITS

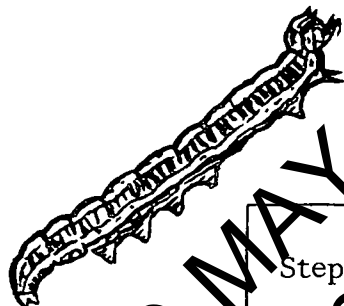
Open to all 4-H members, an educational exhibit relating to conservation of soil, water, forests, rangelands, streams, lakes, estuaries, beaches, plants, and animals and the natural beauty of our state, nation and world. May not exceed 30 inches in width, 24 inches deep (front to back) and 24 inches high.

Classes for county and state fairs: Junior, Intermediate and Senior.

4-H ENTOMOLOGY ADVANCEMENT PROGRAM

This program will make your Entomology project more interesting and help you learn more about insects and how they live. You may advance as fast as you complete the required options. (An option is something that you choose to do.) You may work on several steps at the same time, but must complete them in order.

To complete each step you must do at least six of the listed options for that step and two of each of the Natural Science, Outdoorsman and Personal Development options. Have your leader or parent initial each option when you complete it. When you have done the required options for a step, your leader will order a 4-H Advancement Program Certificate for you.



Step 5 - 4-H Entomologist
Date Achieved _____ Leaders Initials _____
Step 4 - 4-H Insect Naturalist
Date Achieved _____ Leaders Initials _____
Step 3 - 4-H Insect Pathfinder
Date Achieved _____ Leaders Initials _____
Step 2 - 4-H Insect Explorer
Date Achieved _____ Leaders Initials _____
Step 1 - 4-H Insect Seeker
Date Achieved _____ Leaders Initials _____

NAME _____ COUNTY _____

DATE BORN _____ 19__ DATE FIRST ENROLLED IN ENTOMOLOGY PROJECT _____ 19__

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4-H ENTOMOLOGY ADVANCEMENT PROGRAM

Step 1



THE INSECT SEEKER
(Do at least six of these.)

Date
Passed

Approved
by

1. Make or buy an insect net, a killing jar and find or make a suitable box for storing insects. _____
2. Learn and explain how to identify an insect and how it differs from other small animals. _____
3. Collect at least 10 different kinds of insects in 10 or more Orders. _____
4. Mount on insect pins and label at least 10 insects. _____
5. Read about and explain insect development from egg to adult. _____
6. Observe a live insect in nature. Note the season, time of day, what it eats, where it rests and what it does. _____
7. Name three ways insects help man. _____
8. Name three ways insects are harmful. _____
9. Look for insects at night, near light and in cold weather. _____
10. Tell what you learned about their habits and behavior. _____

Also complete at least two each of the Natural Science, Outdoorsmanship and Personal Development options.

_____ has completed all requirements and is approved for advancement to the rank of 4-H Insect Seeker.

Approved by _____

Date _____



Step II

THE INSECT EXPLORER

(Do at least six of these)

Date Passed

Approved by

1. Pick a tree such as an oak and find out how many different insects attack it. Do this by repeated observations over a season and/or by library study. _____
2. Collect and identify 10 predatory insects (those that eat other insects or small animals). _____

3. Rear one insect through its complete life cycle—egg to adult. Species and/or Order. _____
4. Observe five insects that pollinate plants. _____
5. Observe and/or collect five insects that live in the soil. _____
6. Observe and/or collect five insects that live inside dead or living plants. _____
7. Observe and/or collect five insects that live in water. _____
8. Collect insects in a shallow pond and in a fast clear stream. Observe how they differ. Explain why you think they differ. _____
9. By observation, determine which insect Order is most abundant in your neighborhood. _____
10. By observation, determine which insect is most injurious to plants in your neighborhood. _____

Also complete at least two each of the Natural Science, Outdoorsmanship and Personal Development options.

_____ has completed all requirements and is approved for advancement to the rank of 4-H Insect Explorer.

Approved by _____

Date



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Step III

THE INSECT PATHFINDER
(Do at least six of these)

Date Passed Approved by

1. Collect 25 or more insects in one Order. _____
2. Collect or draw and describe the eggs of five different insects. _____
3. Identify as closely as possible the insect Order and the Family or Species of the insect eggs. _____
4. Photograph or collect 10 different kinds of insect damage to plants. Examples--leaf eating, gall forming, bark tunneling, fruit eating. _____
5. Collect five different insects found exclusively in soil. _____
6. Collect five different insects found exclusively in plants. _____
7. Collect five different insects found exclusively in water. _____
8. List 10 crops grown in home gardens and name one or more insects that attack each. _____
9. Visit a County Agent's office and obtain five publications including information on insects. _____
10. Make a report to your club on the safe use of insecticides. Use Extension or chemical company literature as background information. _____
11. Rear one insect possessing an incomplete metamorphosis and one insect with a complete metamorphosis. _____
12. Contact through TIEG a 4-H Entomology Club member in another state or country and exchange information or insects with him. See page 16. * _____
13. Display collections, life history or informational material you assembled at county and/or State Fairs. _____

Also complete at least two each of the Natural Science, Outdoorsmanship and Personal Development options.

_____ has completed all requirements and is approved for advancement to the rank of 4-H Insect Pathfinder.

Approved by _____ Date _____

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Step IV



THE INSECT NATURALIST
(Do at least six of these)



Date
Passed

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by

1. Show a beginner how to make an insect net, killing jar or display case.
2. Show a beginner how and where to collect and how to mount insects properly.
3. Do an insect survey of an important pest on a crop or ornamental plant in your area.
4. Study insect parasites of man, pets, or domestic animals; select three of these parasites and report to your club.
5. Study insect-borne diseases of plants and animals. Collect five insects which carry diseases and report on them.
6. Teach beginning 4-H Entomology members how to use a key to identify Orders of insects.
7. List eight different careers in which an Entomologist may work.
8. Observe an insect through its life cycle on a plant. Examples--tent caterpillar, sawflies on cabbage, elm or birch, painted lady butterfly on thistle or monarch butterfly on milkweed.
9. Make a list of insecticides sold at garden stores to control pests of home and garden. Explain why so many different kinds are necessary.

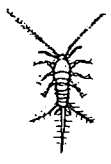
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Also complete at least two each of the Natural Science, Outdoorsmanship and Personal Development options.

_____ has completed all requirements and is approved for advancement to the rank of 4-H Insect Naturalist.

Approved by _____

Date _____



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4-H ENTOMOLOGIST
(Do at least six of these)



Date Passed _____
Approved by _____

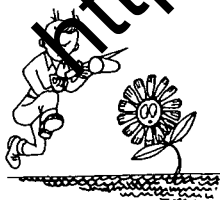
1. Demonstrate the safe handling of pesticides. (Obtain Extension publications on this subject.) _____
 2. Make a Riker mount showing a life history including preserved food plant (leaves, fruit, etc.) _____
 3. Cast insects in plastic resin. _____
 4. Report to others how insecticides may harm the environment. _____
 5. Make a visit to a museum where a professional collection of insects is kept. Note the storage methods, the numbers and variety of insects and how collections are used. _____
 6. Collect insects for a biological supply house. _____
 7. Work for an entomologist doing surveys, collecting at traps or scouting for insect infestations. _____
 8. Rear insects for sale. _____
 9. Study and report on insect fossils. _____
 10. Study and report on insects used as food by man. _____
 11. Attend an Oregon Entomology Society meeting. Become a member. _____
- _____
- _____
- _____

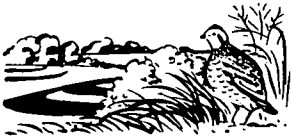
Also complete at least two each of the Natural Science, Outdoorsmanship and Personal Development options.

_____ has completed all requirements and is approved for advancement to the rank of 4-H Entomologist.

Approved by _____

Date _____





NATURAL SCIENCE OPTIONS

(Do at least two of these for each step)

Date Passed

Approved by

1. Observe and/or read about and report on some wild animal or plant. Birds, fish, reptiles and many others are animals too. (This option may be repeated for each step.)
2. Find and identify the tracks of five wild animals.
3. Observe and identify ten birds. List and describe them.
4. Find and identify ten native forest trees or shrubs.
5. Find and identify ten wild flowers or other forest plants, not trees or shrubs.
6. Find and identify ten kinds of aquatic animals such as crayfish, mussels, water striders, starfish, salamanders, etc. List and describe them.
7. List five birds and/or animals that are not protected by law; that can be killed at any time of the year.
8. Explain why plants are essential to animal life.
9. Explain why sunlight is essential to plant and animal life.
10. Explain how tides are caused and why are some tides higher than others
11. Explain how oxygen in the water affects fish and other marine life.
12. Explain the difference between igneous, sedimentary and metamorphic rocks.
13. Explain the difference between rocks and minerals.
14. Study a geologic feature such as a hill, canyon, or cliff and tell how you think it was formed.
15. _____
16. _____

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OUTDOORSMANSHIP OPTIONS

(Do at least two of these for each step)

Date Passed Approved by

- 1. Participate in a community, roadside, campground or stream bank cleanup. (This option may be repeated for each step.) _____
- 2. Keep the area around your home clean and attractive for one month. _____
- 3. Make a map that will show someone else how to get to one of your favorite places. _____
- 4. Demonstrate how to determine directions without a compass. _____
- 5. Build a safe campfire and put it completely out. _____
- 6. Make an overnight hike and camp where you must carry everything you need for at least one mile; leave a clean camp. _____
- 7. Cook a complete meal for yourself and one other person over a campfire. _____
- 8. Live for 24 hours entirely on native food collected out-of-doors. Domestic fruits and vegetables may not be included. You may take salt with you. _____
- 9. Demonstrate how to pack and carry a pack board for overnight hiking. _____
- 10. Make a first aid kit. _____
- 11. Prepare a conservation exhibit or display. _____
- 12. List five ways that birds are beneficial to man. _____
- 13. _____
- 14. _____

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PERSONAL DEVELOPMENT OPTIONS

(Do at least two of these for each step)

Date
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by

1. Lead the Pledge of Allegiance and 4-H Pledge at a 4-H meeting.
2. Lead a song or a game at a 4-H meeting.
3. Preside at a meeting larger than your 4-H club.
4. Write a news story for a local paper.
5. Participate in a radio or television program.
6. Present a demonstration or illustrated talk to a group larger than your 4-H club.
7. Serve as host for a 4-H meeting at your home. See that everyone is welcomed and made comfortable.
8. Serve as a junior leader.
9. Serve as a camp counselor.
10. Enter an identification contest.
11. Enter an exhibit at a county or science fair.
12. Attend 4-H Summer School at Oregon State University.
13. Attend the 4-H Entomology Tour at Oregon State University.

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* TIEG -- Teen International Entomology Group, New York Cooperative Extension Service, Cornell University, Ithaca, New York 14850.

