

University of Kentucky Department of Entomology Curriculum Guide

Insects in the Environment

Essential Question: “How Does The Environment Affect The Insects (and Related Arthropods) That Live in Kentucky?”

For Intermediate Grades (4-5)

The goal of this curriculum guide is to introduce students to insects and to understand how insect biology and diversity in Kentucky are influenced by environmental factors such as water, soil, and vegetation. This guide is designed to be used as an entire unit with assessments at the end of each section and a culminating assessment at the end of the guide. However, individual sections can be used to address specific questions. Please note that this is a guide and does not contain the actual activities: the activities referenced come from a variety of sources, each of which is listed along with the activity.

I. **How do insects compare with closely related organisms?**

When completed, this section addresses the following KERA Academic Expectations:

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and to predict possible future events.

a. **Ants & Uncles**

Objectives: Students compare insects with other arthropods

Source: 4-H Cooperative Curriculum System Publications
Entomology I, "Creepy Crawlies," p26

Materials: clear container to catch and observe insects and their relatives

Setting: outdoor

Time: 1-2 hrs

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

Core Content Connections:

SC-E-3.1.1 Things in the environment are classified as living, nonliving, and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

b. **Interview a Spider**

Objectives: Students learn that insects and spiders are “wildlife”

Source: *Project WILD*, page 12

Materials: research materials (notebooks, etc.)

Setting: classroom

Time: 2 hrs

Assessment: Student is given a live insect or insect relative (or a detailed picture) and explains to his/her peers why the creature is or isn't an insect, discussing characteristics such as: number of legs, number of body parts, presence or absence of antennae, etc.

II. **What are the parts of an insect?**

When completed, this section addresses the following KERA Academic Expectations:

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and to predict possible future events.

a. **Big Bugs, Small Bugs**

Objectives: Students learn basic insect anatomy

Source: 4-H Cooperative Curriculum System Publications
Entomology I, "Creepy Crawlies," p6

Materials: pencils

Setting: indoor

Time: 30 minutes

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

Core Content Connections:

SC-E-3.1.1 Things in the environment are classified as living, nonliving, and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

b. **Insect Cut-Ups**

Objectives: Students learn basic insect anatomy

Source: 4-H Cooperative Curriculum System Publications
Entomology I, "Creepy Crawlies," p12

Materials: pictures of insects, paper, pencils, markers, clear tape, scissors

Setting: indoor

Time: 1 hr

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

Core Content Connections:

SC-E-3.1.1 Things in the environment are classified as living, nonliving, and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

c. **Big Mouth Bugs**

Objectives: Students are introduced to insect mouthpart diversity

Background information: insect mouthparts differ significantly between groups, and recognizing insect mouthparts is an important step towards insect identification. This exercise relates insect mouthparts to common objects (i.e.: chewing mouthparts resemble pliers)

Source: 4-H Cooperative Curriculum System Publications

Entomology I, "Creepy Crawlies," p8

Materials: pencils

Setting: indoor

Time: 30 minutes

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

S-5-LS-1 Students will recognize the relationship between structure and function at all levels of organization (e.g., organ systems, whole organisms, ecosystems).

Core Content Connections:

SC-E-3.1.1 Things in the environment are classified as living, nonliving, and once living. Living things differ from nonliving things. Organisms are classified into groups by using various characteristics (e.g., body coverings, body structures).

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

SC-M-3.1.1 Living systems at all levels of organization demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, organisms and ecosystems.

Assessment: Student chooses an insect of interest and makes a diagram or model of one body part (such as: front leg, wing, head, eye, etc.) and discusses how the insect uses that body part to live in its environment.

III. **Why are insects important to the environment?**

When completed, this section addresses the following KERA Academic Expectations:

2.3 Students identify and analyze systems and the ways their components work together or affect each other.

a. The Web of Insects

Objectives: Students demonstrate the importance of insects by using yarn to represent the links created by insects in the environment.

Source: U.K. Entomology. Contact info for a free copy of this activity:

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Department of Entomology
University of Kentucky
S-207G Ag. Science North
Lexington, KY 40546-0091
859-257-7453, blaken@uky.edu

Materials: spool of yarn

Setting: indoor or outdoor

Time: 15 minutes

Program of Studies Connections:

S-4-LS-9 Organisms change the environment. These changes may be detrimental or beneficial.

Core Content Connections:

SC-E-3.3.3 All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or other organisms; other changes are beneficial.

SC-M-3.5.2 Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make their own food. All animals, including humans, are consumers, and obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.

b. Beneficial Bug Hunt

Objectives: Students search an outdoor environment for beneficial insects and spiders and learn how these creatures use their structures and behaviors to fulfill their ecological role.

Source: Kentucky Bug Connection: University of Kentucky department of Entomology website for Middle-High School:

<http://www.uky.edu/Agriculture/CritterFiles/casefile/bugconnection/teaching/teaching.htm>

Materials: notepad, pencil

Setting: outdoors and indoor

Time: 1 hr for outdoor portion, 1-2 hrs for indoor discussion

Program of Studies Connections:

S-4-LS-9 Organisms change the environment. These changes may be detrimental or beneficial.

Core Content Connections:

SC-E-3.3.1 Plants make their own food. All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants.

SC-M-3.5.2 Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make their own food. All animals, including humans, are consumers, and obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.

Assessment: Student is assigned a beneficial insect (or insect relative) and makes comparisons between that insect and another beneficial animal. For instance, a student may compare a spider with a predatory mammal (like a wolf) or a bee with a pollinating mammal (like a hummingbird). The student should demonstrate why the insect and the other animal are considered beneficial and compare the structures and behaviors of the two creatures.

IV. What insects live in WATER, and how is insect biology affected by water?

When completed, this section addresses the following KERA Academic Expectations:

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and to predict possible future events.

2.3 Students identify and analyze systems and the ways their components work together or affect each other.

a. Three Bugs in a Tub

Objectives: Students observe and compare the structures and behavior of several aquatic insects

Source: 4-H Cooperative Curriculum System Publications

Entomology III, "Dragons, Houses, and Other Flies," p30

Materials: aquatic dip net, observation tray

Setting: outdoor

Time: 1-2 hrs

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

Core Content Connections:

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.
SC-E-3.3.1 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

b. Are You Me?

Objectives: Students learn the relationship between adult animals and their aquatic immature stages

Background Information: Many winged adult insects, such as dragonflies and mayflies, have immature stages that live underwater. This exercise compares those aquatic insects and their parents with other aquatic animals. The exercise could be modified to include more insects, or only insects, depending on the needs of your curriculum.

Source: *Project WILD Aquatic*, page 14

Materials: cardboard, markers, crayons

Setting: indoor

Time: 1 hr

Program of Studies Connections:

S-4-LS-5 Organisms have life cycles that are different for different organisms.

Core Content Connections:

SC-E-3.2.1 Plants and animals have life cycles that include the beginning of life, growth and development, reproduction, and death. The details of a life cycle are different for different organisms.

c. KY Water Watch Biological Assessment

Objectives: Students learn how water quality affects aquatic arthropod populations

Background Information: Different species of aquatic invertebrates (including insects, mollusks, worms, and other creatures) need different types of water to live and are more-or-less sensitive to water pollution. This exercise demonstrates how scientists catch and observe invertebrates to determine water quality and pollution levels.

Source: KY Division of Water

14 Reilly Rd

Frankfort, KY 40601

502-564-3410 ATT: Ken Cooke

Materials: aquatic dip nets, white observation trays

Field Guide to Freshwater Invertebrates by Leska S. Fore

www.seanet.com/~leska

Setting: outdoor (stream, pond, lakes, and other water sources)

Time: 2 hrs

Core Content Connections:

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

Assessment: Student creates a presentation (such as a poster or an interactive digital picture) detailing several kinds of arthropods that live in water, including their ecological role and the structures and behaviors that they use to live in an aquatic environment.

V. What insects live in SOIL, and how is insect biology affected by soil?

When completed, this section addresses the following KERA Academic Expectations:

- 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.
- 2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and to predict possible future events.
- 2.3 Students identify and analyze systems and the ways their components work together or affect each other.

a. Ants & Antics

Objectives: Students observe an ant colony and make simple scientific observations

Source: 4-H Cooperative Curriculum System Publications

Entomology III, "Dragons, Houses, and Other Flies," p8

Materials: food for ants, paper

Setting: outdoor

Time: 1-2 hrs

Program of studies connections:

S-4-SI-3 Use evidence (e.g. descriptions) from simple scientific investigations and scientific knowledge to develop reasonable explanations

S-5-SI-3 Use evidence (e.g. descriptions), logic, and scientific knowledge to develop scientific explanations

b. What Will Pillbugs Choose?

Objectives: Students investigate the habitat and food preferences of roly-polies by offering them choices.

Source: *The Pillbug Project*, by Robin Burnett, p 80-86

Background information: This activity is just one of many in The Pillbug Project. The whole book can be used as a unit and can serve to introduce students to soil creatures and the scientific method.

Materials: plastic containers, sand, several fruits and vegetables, paper towels, and other items used to create choices

Setting: classroom

Time: 1-2 hrs

Program of studies connections:

S-4-SI-1 Ask simple questions that can be answered through observations combined with scientific information.

S-4-SI-3 Use evidence (e.g. descriptions) from simple scientific investigations and scientific knowledge to develop reasonable explanations

S-4-SI-4 Design and conduct different kinds of simple scientific investigations.

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

S-5-SI-1 Identify questions that can be answered through scientific investigations combined with scientific information.

S-5-SI-3 Use evidence (e.g. descriptions), logic, and scientific knowledge to develop scientific explanations

S-5-SI-4 Design and conduct different kinds of scientific investigations to answer different kinds of questions.

Core Content Connections:

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

SC-M-3.2.3 Behavior is one kind of response an organism may make to an internal or environmental stimulus. A behavioral response requires coordination and communication at many levels including cells, organ systems, and organisms. Behavioral response is a set of actions determined in part by heredity and in part from experience.

c. Berlese Funnel Sampling

Objectives: Students use Berlese funnels to sample soil insects and compare and observe insect diversity in different soil types

Source: U.K. Entomology. Contact info for a free copy of this activity:

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859-257-7453, blaken@uky.edu

Materials: Berlese Funnels, electric lamp, electricity source, clear containers for observing insects, soil testing materials (soil probe, soil color book, etc.)

Setting: Outdoor

Time: 1-2 hrs

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

Core Content Connections:

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce and, others die or move to new locations.

Assessment: Student creates a presentation (such as a poster or an interactive digital picture) detailing several kinds of arthropods that live in soil, including their ecological role and the structures and behaviors that they use to live in their environment.

VI. What insects live in FORESTS, and how do forests affect insect biology?

When completed, this section addresses the following KERA Academic Expectations:

2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and to predict possible future events.

2.3 Students identify and analyze systems and the ways their components work together or affect each other.

a. Sweep net sampling

Objectives: Students will use a common method used to collect insects in plants, allowing them to observe insect diversity in different types of vegetation

Source: U.K. Entomology. Contact info for a free copy of this activity:

Blake Newton

Department of Entomology

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859-257-7453, blaken@uky.edu

Materials: sweep net, white observation trays, plastic bags

Setting: outdoor

Time: 1-2 hrs

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

Core Content Connections:

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

b. Termite Trails

Objectives: Students observe termites, learn about insect trailing behavior, and conduct simple scientific investigations

Source: Kentucky Bug Connection: University of Kentucky department of Entomology website for Middle-High School:

<http://www.uky.edu/Agriculture/CritterFiles/casefile/bugconnection/teaching/teaching.htm>

Materials: Papermate pens (blue), other writing utensils (markers, pencils, pens), blank paper, worker termites, Petri dishes

Setting: Indoor

Time: 1 hr

Program of studies connections:

S-4-SI-1 Ask simple questions that can be answered through observations combined with scientific information.

S-4-SI-3 Use evidence (e.g. descriptions) from simple scientific investigations and scientific knowledge to develop reasonable explanations

S-4-SI-4 Design and conduct different kinds of simple scientific investigations.

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

S-5-SI-1 Identify questions that can be answered through scientific investigations combined with scientific information.

S-5-SI-3 Use evidence (e.g. descriptions), logic, and scientific knowledge to develop scientific explanations

S-5-SI-4 Design and conduct different kinds of scientific investigations to answer different kinds of questions.

Core Content Connections:

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

SC-M-3.2.3 Behavior is one kind of response an organism may make to an internal or environmental stimulus. A behavioral response requires coordination and communication at many levels including cells, organ systems, and organisms. Behavioral response is a set of actions determined in part by heredity and in part from experience.

c. Things That Buzz in the Night

Objectives: Students learn about nocturnal forest insects and their behavior

Background Information: flying insects are attracted to lights at night, especially UV blacklights. This exercise demonstrates this phenomenon, and allows students to discuss why insects have this behavior.

Source: 4-H Cooperative Curriculum System Publications
Entomology II, "What's Bugging You?," p22

Materials: white sheet, rope, clear container, pencil, light source

Modification: this exercise works best when used with an ultraviolet "black light" bulb

Setting: nighttime in or near forest

Time: 1-2 hrs

Program of Studies Connections:

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

Core Content Connections:

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

SC-M-3.2.3 Behavior is one kind of response an organism may make to an internal or environmental stimulus. A behavioral response requires coordination and communication at many levels including cells, organ systems, and organisms. Behavioral response is a set of actions determined in part by heredity and in part from experience.

Assessment: Student creates a presentation (such as a poster or an interactive digital picture) detailing several kinds of arthropods that live in forests, including their ecological role and the structures and behaviors that they use to live in their environment.

VII. How is insect biology and diversity affected by differences between WATER, SOIL, and FOREST habitats?

a. Insect Sampling Comparison: Berlese Funnel, Aquatic Dip Netting, Sweep Netting

Objectives: Students compare insect sampling techniques in different habitats and learn why certain sampling methods work in one habitat and not another based on anatomy and behavior of the insects that live in those habitats.

Source: U.K. Entomology. Contact info for a free copy of this activity:

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859-257-7453, blaken@uky.edu

Materials: Berlese funnels, electric lamps, source of electricity, isopropyl alcohol, hand trowel, collection vials, aquatic dip nets, white observation trays, sweep nets, plastic bags

Setting: outdoor and indoor

Time: 1-2 hrs for each sampling method; up to 6 hours over different class periods

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

Core Content Connections:

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

b. Insect Observation Among Habitats

Objectives: Students observe insects and their relatives in water, soil, and forest habitats. Based on observation, students will discuss why creatures that live in one habitat are adapted to that habitat.

Source: U.K. Entomology. Contact info for a free copy of this activity:

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859-257-7453, blaken@uky.edu

Materials: notebook, pencil

Setting: Outdoor

Time: 1 hr for each habitat

Program of Studies Connections:

S-4-LS-3 Organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

S-4-LS-7 Organisms' patterns of behavior are related to the nature of organisms' environments. There are many different environments (e.g., deserts, rain forests) on Earth that support different types of organisms.

Core Content Connections:

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

SC-E-3.3.2 The world has many different environments. Distinct environments support the lives of different types of organisms. When the environment changes, some plants and animals survive and reproduce, and others die or move to new locations.

Assessment: Unknown insects: students are shown insects that they have not seen before and try to determine what type of habitat they live in (forest, soil, or water) based on their structures and behavior. It is okay if the students do not guess the right habitat, but they should be able to tell you why they think the insect comes from one habitat or another based on evidence from structures and behavior.

Culminating Assessment

Field Guide to Schoolyard Insects (and their Relatives)

Objectives: Students work together to create a field guide to the insects and insect relatives that live in a nearby outdoor habitat, such as a schoolyard garden

Source: Kentucky Bug Connection: University of Kentucky department of Entomology website for Middle-High School:

<http://www.uky.edu/Agriculture/CritterFiles/casefile/bugconnection/teaching/teaching.htm>

Materials: notebook

Setting: any outdoor natural environment, such as a garden, meadow, flower bed, or crop (and indoors for discussion and construction of field guide)

Time: 1-2 hrs outdoors, plus 1-3 hrs total time indoors for research and field-guide construction

Program of Studies Connections:

S-4-LS-3 Students will understand that organisms have different structures that serve different functions. These structures are used to sort organisms into groups.

S-4-LS-5 Students will understand that organisms change the environment. These changes may be detrimental or beneficial.

S-5-LS-1 Students will recognize the relationship between structure and function at all levels of organization.

Core Content Connections:

SC-E-3.1.3 Each plant or animal has structures that serve different functions in growth, survival and reproduction.

SC-E-3.3.3 All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organism; other changes are beneficial.

Important Entomology Resources

Essential Books

Peterson Field Guide to Insects: by Borror and White (apx \$20)
Spiders and Their Kin (Golden Guide): by Levi and Levi (apx \$7)
Butterflies and Moths (Golden Guide): by Mitchell and Zim (apx \$7)

Other Recommended Books

Peterson Field Guide to Beetles: by White (apx \$20)
National Audubon Society Field Guide to North American Insects and Spiders: by Milne et al (apx \$20)
Peterson First Guide to Caterpillars of North America: by Wright (apx \$7)
Simon and Schuster's Guide to Insects: By Arnett and Jacques (apx \$17)
Guide to Common Freshwater Invertebrates of N. America: by J. R. Voshell) (apx \$36)
Leaf Pack #KIT9429 Invertebrate Cards: Acorn Naturalists (1-800-228-8886) (apx \$35)

These laminated cards are a good additional resource for the KY Water Watch Biological Assessment activity.

Supplies

Aquatic Dip Nets – 10 inch - apx \$5 each at local pet stores
Sweep Nets - Gempler's (<http://www.gemplers.com/>), \$25-50 each
Larval Trays (white trays to observing collected insects) – Bioquip (<http://www.bioquip.com/>), #1426, \$8-10 each
Soft "Featherweight" Forceps (pick up insects without causing damage)- Bioquip (<http://www.bioquip.com/>), #4748, \$5 each
Collection Vials (to store soft-bodied arthropods) – Bioquip (<http://www.bioquip.com/>), #8804P, 8806P, or 8808P, \$5-7 dozen
Isopropyl or Ethyl Alcohol (to preserve collected insects)
Blacklight (to attract nocturnal insects) – Bioquip (<http://www.bioquip.com/>), #2805 (DC), 2804 (AC/DC), 2806 (AC), \$50-80 each
Berlese Funnel - Berlese funnels can be purchased or hand-made. Science Kit & Boreal Laboratories (<http://www.sciencekit.com/>) sells Berlese funnels for about \$45 each. Acorn Naturalists has a compact Berlese funnel for about \$60 each. Bioquip (<http://www.bioquip.com/>) has a \$70 Berlese funnel (#2831). Berlese funnels can also be "homemade." The following website has instructions for a simple Berlese funnel involving plastic soda bottles, wire screen, and a few other components:
www.archbold-station.org/discoveringflscrub/unit3/unit3b1part2.html
There is not just one way to make a Berlese Funnel. Check the Internet for other instructions, or design your own based on the principals suggested by the design in the website above.