



Balcones Canyon Lands National Wildlife Refuge
24518 FM 1431, Marble Falls TX 78654
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INSECT FAMILIES AND LIFE CYCLES

VOLUNTEER DIRECTIONS

Need to Know

1. Your station, INSECT FAMILIES AND LIFE CYCLES (Station #2), will have students:
 - a. Understand the 3 basic life cycles: incomplete and complete metamorphosis and no metamorphosis in which the young are born looking like miniature adults.
 - b. Using some distinguishing characteristics (mouthparts, legs, and wings) to 'key' or identify the order of an insect.
 - c. Understand some of the adaptations that help them survive and reproduce in their environment. Compare adaptive characteristics.**TEKS:** Species have different adaptations that help them survive and reproduce in their environment. Compare adaptive characteristics.
2. You **must include something about the Golden-cheeked warbler and Blackcapped vireo into this program (a section in this guide book has more on both birds)**. Any logical tie-in is good: insects as food, habitat the birds forage to find the food, insect threats to the birds, etc. After all, these birds are the reason there is a refuge near Austin. Furthermore, all of the resource management and public use management plans on the refuge must consider how these birds will be affected by man induced impacts.
3. The section in these directions called "Inherited versus Learned Behavior" is a specific science TEK requirement. **Get to know the Inherited and Learned TEKS and be ready to share this with the students.**
4. **A map** of the stations is in this guide book to help you direct your group to the next station. They go clock-wise in number order. Please be ready to direct your group to the next sequential station.

Sequence of Stations in Bridges to Birding 1.

What is an Insect?

- 2. Insect Families and Life Cycles**
- 3. Collecting and Studying Insects**
- 4. Insect Senses**
- 5. Insect Habitat**
- 6. Social & Beneficial Insects**
- 7. Aquatic Insects**

GOLDEN-CHEEKED WARBLER (GCW)

HABITAT: Old forests with big trees; shady, dense forests in steep-sided canyons & slopes as well as drier, flat hill tops. Requires Ashe Juniper ("cedar") bark to



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construct nest. **Spanish Oak, Live Oak, cedar foliage provides insects, caterpillars, spiders, beetles for food.**

TERRITORY: 5-20 acres to forage; NEST TERRITORY: 3-6 acres/ nesting pair

Female constructs Cup nest in old cedar and Hardwood (oak, elm) trees at least 15' high. All nests require cedar bark. **Bark is woven with spider webs.** Nest is tucked in forked vertical limb & camouflaged. Warblers usually nest only once/season unless accident or predation. Male stays nearby singing & defending during incubation. 3-4 eggs are hatched in 12 days & fledge 8-9 days later. Parents care for them for 1 month.

GCWs migrate to pine/oak habitat of southern Mexico & Central America in July-mid-August & return in mid-March.

BLACK-CAPPED VIREO (BCV)

HABITAT: Dense, shrubby, broad-leafed (shin oak, hackberry, sumac, agarita, persimmon, Texas Mountain Laurel) young forest. Patchy habitat with 30-60% cover interspersed with open grassland.

Shrubby vegetation reaching from ground level to 6- 7' high.

TERRITORY: 1-16 acres;NEST TERRITORY: 2-4 acres

Male & female select nest site between 3-'6' off ground (door knob height) in dense cover. Pendulous Cup Nest is made by female from grasses and **spider webs** and is suspended from its rim in the fork of a branch. Nest is completed in 2-3 days. They may nest more than once /year building a new nest each time. Incubation is 14-17 days and this work is shared by male & female (as well as fed by both). Fledge in 1012 days.

BCVs arrive in mid-March to mid-April and stay until mid Sept. They spend their winter in western Mexico.

INSTINCTIVE v.s. LEARNED BEHAVIOR

Behavior is how an animal acts (what it does and how it does it). Animals such as insects, mollusks, fish, amphibians, reptiles, birds and mammals all have inherited and learned behavior. Insects, mollusks, fish, amphibians, reptiles, have mostly instinctive and very little learned behavior.



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Instinctive behaviors: behaviors that occur without experience, a pattern of activities that is not learned; are born with the ability to perform the task.

Example of an instinctive behavior – Cockroaches running from light or honeybees communicating by dance to show others where to find food. Other examples include metamorphosis, spinning webs, body reflexes.

Learned behaviors: behaviors that are changed by experience

Example of a learned behavior - When visiting a clover flower, a cabbage white butterfly detects a potential host plant from a distance then makes the final determination only after alighting on a leaf and tasting it with the receptors on her tarsi or feet.

Butterflies returning to the same roosting sites night after night.

Getting Ready

Use the laminated activity station sign to identify your table (in the guide book). Set up the badminton net in a location that allows full access to the net by at least 15 students at one time.

Use the laminated order photos to hang up on the badminton net. Clips are provided. Have the order answer key handy to help the students place their insect photos.

Materials List

Laminated Activity Signs (2)

Table (1)

Station Guide Book

Flipbook Presentation or Guidance for Volunteer

Badminton Net, stakes, pins for wires

Laminated Order Pages

Laminated Insect Photos

Insect Replicas: ladybug life cycle figures, cicada, housefly life cycle in Lucite, monarch butterfly figures, dragonfly in Lucite, grasshopper life cycle in Lucite, walking stick in Lucite, Scorpion in Lucite

Taking Flight!

Goals

1. Understand the 3 basic life cycles: incomplete and complete metamorphosis and no metamorphosis in which the young are born looking like miniature adults.
2. Using some distinguishing characteristics to 'key' or identify the order of an insect.
- 3.



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Understand some of the adaptations that help them survive and reproduce in their environment. Compare adaptive characteristics.

Activities

Life cycle (metamorphosis)

- Begin with the butterfly which most students will know (egg, larva, pupa, adult) (plastic figures in Ziploc bag)
- Show how other insects have same stages (ants, ladybugs) (plastic figures in Ziploc bags)
- Show there are some exceptions (grasshopper, cicada) (life cycle of a grasshopper in Lucite and single cicada in Lucite)

Incomplete Metamorphosis

Complete Metamorphosis No Metamorphosis

Examples: dragonflies, grasshopper	Examples: butterflies, ant, bee	Examples: spider, scorpion
Egg	Egg	Egg (scorpions are born live)
Larvae – similar to adult	Larvae – looks different from adult	X
X	Pupae – state in which larvae changes to adult form	X
Adult	Adult	Adult

How do you tell the difference between insects? There are many ways to identify and classify an insect. Some of the most common ways are by using their legs, the mouthparts, and/or the wing type to identify them.

- Differentiate by looking at mouthparts (placard)
- Differentiate by looking at legs (use placard)
- Differentiate by wing type (chart)
- Chart also has names of orders, many of which named after wing type (optera=wing)
- Exercise: Each child gets insect card to see if they can find another insect in the same order (same classification) by looking at legs, wings, tails, etc.



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Why are Insects in Classifications?: Needed to study the thousands of insect species.

Quiz Your Guests

1. What is a “nymph”?
2. True or False: Insects are born from eggs.

Take Away

Show the students the insect galls. Discuss how wasps have adapted to laying their eggs on plants and how the plants react to protect it by creating a gall around the egg. The small hole in the gall is where the insect exits once it hatches.