



Revised 4/17/20
Neal Smith National Wildlife Refuge

Catch and Release Insects

5th Grade

60 Minutes

Fall

Summary

A field leader uses introduce students to the definition of insects and different insect groups. Afterwards, students work in groups to generate questions about prairie insects and set up data collection sheets in their nature journals. In the field, students use bug-boxes to collect, observe, and record data about insects. In their groups, students work to classify the insects into appropriate insect groups (e.g. Hemiptera, Homoptera, Lepidoptera, Coleoptera, Hymenoptera, Diptera). Students must release insects back into the prairie. Lastly, students share their results and comment about findings that surprised them.

Next Generation Science and Iowa Core Standards

Next Generation Science

- **3-5-ETS1-1**
 - Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2**
 - Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- **3-5-ETS1-3**
 - Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.



Revised 4/17/20
Neal Smith National Wildlife Refuge

Literacy

Speaking and Listening

- **SL.5.1**
 - Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
- **SL.5.4**
 - Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Materials and Resources

- Blank paper & clip boards or nature journals
- Pencils
- Bug jars/bug boxes & Insect ID sheets/field guides
- Nets
- Ribbon (for boundaries)

Presentation

Explain to students that today they are going to be doing an investigation about prairie insects. Write the word “insect” on the board. Ask a student volunteer to explain what the word insect means. What do we already know about insects? If students need extra guidance, ask them specific questions such as:

- What insects live in the prairie?
- What insects have you seen before?
- What do insects eat?
- Where could we find them?
- Are all bugs insects?

Remember that all insects have 6 legs, 3 body parts, and 2 antennae. Tell students that today they are going to be going outside and trying to answer their own questions about insects. But first, they need to learn more about prairie insects.

Directions



Revised 4/17/20
Neal Smith National Wildlife Refuge

1. Give an overview of the different orders of insects: Beetles/Coleoptera; True Bugs/Hemiptera; Cicadas and kin/Homoptera; Bees, Ants, Wasps, and kin/Hymenoptera; Butterflies and Moths/Lepidoptera; Dragonflies/Odonata; Grasshoppers and Crickets/Orthoptera. See the *Background Information* section if you need more information about these orders. If available, show students photos of each.
2. Help the students brainstorm their own questions about prairie insects. For example, will we find more beetles or butterflies on the prairie? What types of insects will we find on flowers, and what types of insects will we find near the soil? Which type of insect is most common on the prairie during this season? Where will we find the most Orthoptera insects?
3. Explain that soon the class will be splitting into groups and heading outside to explore and try to answer our questions. Afterward, we will compare our observations to answer our questions about insects.
4. Help students prepare their journal entries by modeling on the board. Be sure they include date, time, temperature, weather conditions, and location in their heading. Title their entries "Prairie Insects". Model an example of what they include in their journals when they find an insect (draw a picture of it, describe it, list its behaviors).
5. Tell students that they are now almost ready to go outside to explore. Put students into small groups and put an adult chaperone with each group if possible. While journaling, students should try to be quiet, so that each naturalist can think about their questions and concentrate on their observations.
6. Ask each group to decide on a wonder question from the list on the board. Write the question down on their page. Once every group member has the question down, their group may receive their supplies (bug boxes and insect ID sheets or field guides). Remind students that naturalists are happy outside, explorers, adventurers, respectful, prepared, responsible and quiet. They ask questions, use words, numbers and pictures, and share their discoveries.
7. When outside, provide them with boundaries. While the students are bug



Revised 4/17/20
Neal Smith National Wildlife Refuge

catching and journaling, rotate among groups. Ask students questions and try to help with any problems they have with identifying insects.

- 8.** After about 15 minutes, ask students and adult chaperones to release their insects and line up to head back inside. Instruct students that while they are walking to go back inside, they should think about the discoveries they made and get ready to share them with the other naturalists.
- 9.** Once inside, have students sit down. Ask the students to consider the questions they posed at the beginning of the activity. Ask them to write at least one sentence in their journals answering the question they selected. Encourage students to also journal about other discoveries they made or anything that surprised them about prairie insects.
- 10.** Include a sketch of where one or two of the insects fit into a food chain on a prairie. Homoptera are plant eating organisms. The plant produces energy from the sun. What about the predator insects? Did students observe insects which are decomposers?



Revised 4/17/20
Neal Smith National Wildlife Refuge

Background Information

Insects are an important part of the food chain. Their activities within a plant community are dependent upon their niches in the food web. Basic orders of insects that may be collected are:

Beetles/Coleoptera: Means “sheath wing.” Beetles have tough “armorlike” forewings that cover membranous hindwings used in flying. They often are brightly colored or patterned. Many beetles are predators, others are scavengers, and a few are parasites. Some attack plants and stored food, while others pollinate flowers and eat plant pests.

True Bugs/Hemiptera: Means “half wing,” referring to the half-membranous forewings. The hind pair of wings are membranous and slightly shorter. Almost all true bugs’ first pair of wings fold flat over the back displaying a leathery base and membranous tip. Most true bugs are terrestrial, but a few are aquatic. They are predatory in most cases, parasitic in a few. Many species suck plant juice.

Cicadas and kin/Homoptera: Means “similar wing” – both forewing and hindwing are membranous. Homopterans (treehoppers, leafhoppers, aphids) have sucking beaklike mouth parts far back beneath the head. All homopterans are plant feeders.

Bees, ants, wasps, sawflies and kin/Hymenoptera: Means “membranous wing.” Adults have hard bodies and two pairs of membranous wings with large cells and few veins. Bees, ants, and wasps have a constriction or “waist” between the abdomen and thorax. Sawflies are “waistless” and do not sting. Other members of this order may sting so caution should be used in handling this group.

Butterflies and Moths/Lepidoptera: Means “scaled wings.” These insects have four membranous wings covered by pigmented or prismatic scales that rub off easily. The mouth parts of most adults form a long, coiled tube or proboscis used for drinking liquids. In some species, adults do not feed. Butterflies fly only during the day and tend to be brightly colored. Most



Revised 4/17/20
Neal Smith National Wildlife Refuge

butterflies hold their wings together vertically over the thorax at rest. Most moths fly at night and hold their wings “rooflike” over the bodies.

Dragonflies/Odonata: Dragonflies’ four powerful wings move independently. They cannot fold their wings flat against the body. Their wings allow them to fly forward and backward. Both the naiad (immature, aquatic) and flying adults are highly beneficial predators that destroy huge numbers of mosquitoes.

Grasshoppers and crickets/Orthoptera: means “straight wing.” The forewing is leathery, long, and narrow; the hindwing is membranous. The forewing is not used for flying. Orthopterans are easily recognized by long powerful hind legs used in jumping.



Resources

Insects of Neal Smith

<p>DRAGONFLIES + DAMSELFLIES (Order Odonata)</p>  <ul style="list-style-type: none">• four long, veiny wings• narrow body• large eyes• tiny antennae• long, skinny body shape• often found in the air, usually near wet areas or bodies of water	<p>TRUE FLIES (Order Diptera)</p>  <ul style="list-style-type: none">• only two wings• eyes often very large• usually short antennae• sucking mouthparts sometimes visible• often found in the air or on and around warm-blooded animals
<p>BUTTERFLIES, SKIPPERS + MOTHS (Order Lepidoptera)</p>  <ul style="list-style-type: none">• four large, dusty/scaly wings• thick body• have longer antennae• many young have silk glands to make cocoons or other shelters• often found in the air or on flowers	<p>ANTS, BEES + WASPS (Order Hymenoptera)</p>  <ul style="list-style-type: none">• often have black + yellow warning patterns• when winged, there are four present• thin waists• many have stingers• some winged, but not all• often found on flowers, in and around mounds, flying or crawling



Revised 4/17/20
Neal Smith National Wildlife Refuge

TRUE BUGS (Order Hemiptera)	BEETLES (Order Coleoptera)
 <ul style="list-style-type: none">• wings folded in X pattern flat on back• antennae usually obvious, long• many have triangular shaped, flattened bodies• often found on leaves of trees and bushes and in grasses	 <ul style="list-style-type: none">• wings fold to form straight line visible down back• four wings – two form hard and protective “shell”, the other two are used for flying• often found on flowers, leaves, on the ground and in the air
CICADAS, HOPPERS, APHIDS + OTHERS (Suborder Homoptera)	GRASSHOPPERS, CRICKETS + KATYDIDS (Order Orthoptera)
 <ul style="list-style-type: none">• most hold wings roof-like over body• antennae often short• aphids are tiny and pear-shaped• often found on bushes, trees or in grasses	 <ul style="list-style-type: none">• very long hind legs for jumping• wings accordion-like• green, brown or grey – excellent camouflage• “sing” by rubbing their legs together• mainly found in grasses or on the ground