

Practice Tips: Don't Bug Me



CLARIFYING NOTES:

Although the title refers to bugs, this event is about **arthropods**, a group that includes spiders, lobsters, and butterflies – but **none** of these is a true bug!

We also found several misspellings in the event description in the official manual. Please see the *Errata* section at the end of this Tip Sheet.

USEFUL WORDS TO KNOW:

Here are some representative words you should know.

Exoskeleton	Abdomen	Metamorphosis	Mandible	Larva	Caterpillar
Antenna	Thorax	Compound Eye	Pedipalp	Pupa	Egg Sack
Scales	Segmented	Chrysalis	Proboscis	Chitin	Jointed

USEFUL THINGS TO TRY:

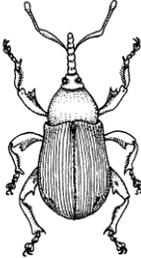
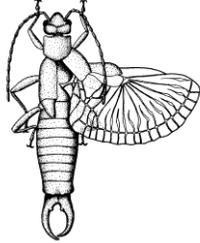
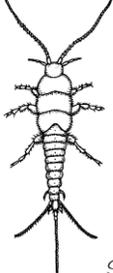
Practice with your teacher or at home with a parent.

1. Have an Arthropod Adventure! This group of animals is all around us, both inside and outside. They are crafty creatures who find a way inside even well-cleaned houses or schools. Spend 15 minutes looking around carefully to see how many examples you can find. Check out this website to see how many household invaders you found: <http://arthropods.yourwildlife.org/>. Can you identify all yours?
2. What's Your Order? This event includes knowing the **orders** of the Insects, six-legged creatures that often have wings and antennae. The names of each order are taken from the Latin language, and they identify some easily observed feature of all of the creatures in the order. Investigate each order using the online sites listed below or a reference book about insects. Can you name the distinguishing feature behind the name for **all** of the **insect orders** listed in our table at the end of this Practice Tip sheet?
3. "Tell the Waiter that I'll Have the Arthropod." Investigate the use of arthropods in cooking and foods from around the world. How many examples can you find the next time you go to the grocery store with your parents? (Be sure to look in the Seafood section.) One edible arthropod product is the food coloring called cochineal. Can you find it in anything?
4. The official Rules Manual says that you can bring a key to help answer the questions. **We require a student-made key – nothing merely printed out.** Look at the table in this Tip for some ideas of things to include, like pictures, ecology notes and names of parts!



5. Make a **dichotomous key** that allows you to figure out members of the different insect orders. (This is difficult if you include *all* of them, so you might start with just the orders tagged as *Tourney Focus* in the attached table.)

Here are some examples to get you started – see any differences? (Two orders below are not *Tourney Focus*, but they may still visit our Tournament! Scale varies.)

Diptera	Coloptera	Dermaptera	Thysanura
			
Adult Housefly	Adult Weevil	Adult Earwig	Adult Silverfish

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USEFUL WEBSITES TO SEE: We verified these in January, 2015.

- <http://bugguide.net/> (Everything but crustaceans.)
- <http://entomology.k-state.edu/extension/4-h-and-youth/insect-orders/> (Excellent info on insects.)
- <http://www.ento.csiro.au/education/index.html> (Info for non-insects, also.)
- <http://www.cals.ncsu.edu/course/ent425/library/index.html> (Another hexapod-only site.)

RULE CLARIFICATIONS:

These apply only to DeKalb’s Elementary Tournament for 2015.

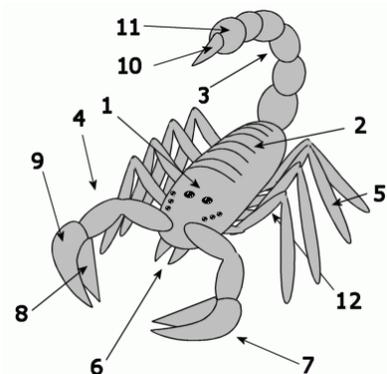
1. The attached table describing the Insect orders has a column marked “Tourney Focus.” We will definitely have questions related to these at our tournament.
2. We **will** use the Latin names for the classes and orders that are listed in the Event Description (and in the attached tables), but students **will not** need to know full Latin names for any individual species. Furthermore, we will not ask students to identify creatures at the species level using terms other than common names such as those provided in the attached tables. (This may not be true for State.)
3. A creature’s “ecological significance” can include its economic effect on agriculture and cash crops, particularly crops important for Georgia’s economy.

ERRATA for the Event Description in manual:

Diploda should be **Diplopoda**.
 Ephemrida should be **Ephemerida**.
 Hymenoptera should be **Hymenoptera**.

In the *Sample Questions*:

- A. In the question, “class” should be “order.”
- B. In answer choice 3, “plumes” should be “plumose.”



Source: Wikimedia Commons

Don't Bug Me



Students may want to extend these tables to include columns for the other aspects that the event addresses: habitats, ecological significance, life cycle, and body parts. The last of these will sometimes change as the creatures develop!

Major Classes of the Arthropods

Name of Class	Common Names and Examples	Features / What to Look For
Arachnida	Spiders, scorpions, mites and ticks, daddy longlegs (also called the granddaddy longlegs)	Eight walking legs and no antennae. Eyes are not compound. The class includes more than spiders.
Crustacea	Lobsters, crayfish, crabs, barnacles, roly-polies (isopods), water fleas, sea monkeys	Two pairs of antennae. Most species are aquatic in both marine and freshwaters.
Chilopoda	Centipedes	One pair of walking legs on most trunk segments, and there are many segments. They are carnivores.
Diplopoda	Millipedes	Two pairs of walking legs on most trunk segments, and there are many segments. Most are herbivores.
Hexapoda	Insects	Six legs. Adult forms frequently have wings and antennae but not always! Their classes are described in the following table.

Orders of the Insects (the *Hexapoda*)

Name of Order	Common Names and Examples	Typical Features / What to Look For	Tourney Feature
Orthoptera	Grasshoppers and crickets	Long antennae, big jumping legs, large wings that lie flat along body when not flying.	*
Isoptera	Termites	White or colorless bodies that resemble ants. Colony lifestyle with homes frequently found in the soil or in rotting wood.	*
Coleoptera	Beetles: dung beetles, long-horned beetles, June beetles (also called June bugs), Ladybugs, boll weevils	Hard, shell-like front wings that cover their flying wings. The larvae are often called grubs.	*
Hymenoptera	Bees, wasps, ants	Almost all have three distinct body parts with a pinched in, very narrow waist.	*
Lepidoptera	Butterflies, moth, skippers	Adults have straw-like siphon tubes for their mouth. The larvae are caterpillars with chewing mouths.	*
Hemiptera	Stink bugs, leaf-footed bugs	All true bugs have a piercing-sucking mouthpart, looking something like a beak. Most adults have four wings. Most possess stink glands.	*

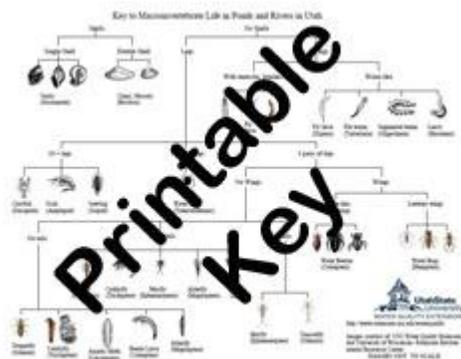


Diptera	True flies: house flies, blow flies, flesh flies, horse flies	Only two true wings, with a narrow neck between head and thorax. Many have compound eyes.	*
Homoptera	Aphids, cicadas, leafhoppers, scale insects	All have piercing-sucking mouthparts, and all are herbivores, so they are common plant pests. They may or may not have wings.	
Mallophaga	Chewing lice, biting lice, bird lice	Wingless and flat-bodied, usually with large chewing mouthparts. They have wide heads, in general. They are parasitic on birds and (to some extent) on mammals.	
Anoplura	Sucking lice: head lice, body lice, pubic lice on humans and other mammals	All are wingless, blood-sucking parasites on mammals. Head is narrower than the thorax.	
Neuroptera	Lacewings, hellgrammites, mantis flies	Large wings with prominent, net-like veins that give wings an appearance like lace	
Ephemera	Mayflies	larvae are aquatic and spend several months or years in water before they emerge to live very briefly as adults with big, buggy eyes and three graceful tail whips.	
Odonata	Dragonflies, damselflies	Large horizontal wings, big, buggy eyes, and straight, rigid bodies.	
Siphonaptera	Fleas	Small, wingless parasites. Adults have sucking mouthparts.	
Dermaptera	Earwigs	They have chewing mouthparts, and they have two sharp pincers at the other end of their body, like a pair of pliers.	
Trichoptera	Caddisflies	The adults look like moths, but caddisflies have thin, slender antennae. Their larvae always live in water, unlike moths.	
Thysanura	Silverfish	Flat body, tapered end, three whip-like "tails"	

ADDITIONAL RESOURCES:

Arthropods frequently live in fresh water streams, and they are important markers of a stream’s biological health. Consequently, another excellent way to find information about them is to search for the following terms: *macroinvertebrates*, *benthic zone*, or *stream ecology*.

The image below shows an example of a **dichotomous key**. (The PDF version of this Tip Sheet includes a hyperlink to the nice, large, printable version from its source, the Utah State University Water Quality Extension program.)



Images courtesy of USU Water Quality Extension and University of Wisconsin–Extension Environmental Resources Center.

Click on chart to download a larger version! Source: <http://www.extension.usu.edu/waterquality>

Your school library or local library may also have a copy of a reference book like this:

Save Our Streams Monitor's Guide to Aquatic Macroinvertebrates, by Loren Larkin Kellogg (Izaak Walton League of America, 1992)