

AMAZING ARTHROPODS

DESCRIPTION: Students will be required to demonstrate an understanding of the major arthropod groups. This knowledge will also be applied to recognize the arthropods in their own neighborhood by assembling a collection of arthropod specimens or specimen photographs and identifying them in advance of the tournament.

TEAM SIZE: 1 or 2 students

APPROXIMATE TIME: 30 minutes

WHAT TO BRING: A pencil, and the team's arthropod collection. (*Note: the arthropod collection is not needed for any practice events*). Each team may also bring one, 8 ½" x 11", two-sided page of notes.

THE COMPETITION:

Part 1: A test consisting of multiple choice and true or false questions presented in a station-based format. Teams will rotate among approximately 20 stations with about 1 minute at each station. Each station may include 3 to 6 questions. Students will record their answers on a ZipGrade form. One station will be designated as tie-breaker questions, and will have a fill-in-the-blank format. The scope of subjects listed below will be the basis for questions on the test.

For the groups listed in more detail in Table 1 and Table 2, students should be able to:

Arthropod Classes and Insect Orders <i>(Table 1)</i>	Know the key characteristics of each listed arthropod Class and insect Order, visually recognize specimens that belong to each, and describe basic biology & anatomy.
Arthropod Species <i>(Table 2)</i>	Visually recognize each species, describe the species' unique physical and behavioral characteristics, describe the habitat in which it lives, describe the niche which this species holds in our ecosystem, and its conservation status.

Studying these general topics will help the student be more successful:

- Linnaean classification
- Basic arthropod anatomy
- How to use dichotomous keys
- Various methods and tools of collecting arthropods
- Arthropod life cycle (metamorphosis)
- Arthropod defenses
- Arthropod respiration
- Economic impacts
- Pest control tactics

Many of these topics are covered in the associated study guide and other resources posted on the event website.

Table 1:

Arthropod Classes	Insect Orders	
Arachnida	Blattodea	Mantodea
Branchiopoda	Coleoptera	Megaloptera
Chilopoda	Diptera	Neuroptera
Diplopoda	Ephemeroptera	Orthoptera
Insecta	Hemiptera	Odonata
Malacostraca	Hymenoptera	Trichoptera
	Lepidoptera	

Table 2. Arthropod Species

Class & Order	Common Name	Scientific Name
Class: Insecta		
Order: Blattodea	American cockroach	<i>Periplaneta americana</i>
	German cockroach	<i>Blattella germanica</i>
Order: Ephemeroptera	Giant mayfly*	<i>Hexagenia limbat</i>
	Light cahill*	<i>Stenacron interpunctatum</i>
Order: Mantodea	Chinese mantis	<i>Tenodera sinensis</i>
	European mantis	<i>Mantis religiosa</i>
Order: Megaloptera	Eastern dobsonfly*	<i>Corydalus cornutus</i>
	Spring fishfly	<i>Chauliodes rastricornis</i>
Order: Neuroptera	Spotless antlion*	<i>Myrmeleon immaculatus</i>
	Red-lipped green lacewing	<i>Chrysoperla rufilabris</i>
	Brown wasp mantidfly	<i>Climaciella brunnea</i>
Order: Trichoptera	Shrunken giant caddisfly*	<i>Agrypnia deflata</i>
	Diamond northern caddisfly*	<i>Limnephilus rhombicus</i>
	Silver-striped sedge*	<i>Hesperophylax designatus</i>
Class: Arachnida	European red mite	<i>Panonychus ulmi</i>
	Lonestar tick	<i>Amblyomma americanum</i>
	Goldenrod crab spider	<i>Misumena vatia</i>
	Long-bodied Cellar Spider	<i>Pholcus phalangioides</i>
	Eastern Harvestman	<i>Leiobunum vittatum</i>
	Black and Yellow Garden Spider	<i>Argiope aurantia</i>
Class: Branchiopoda	Cross Orb Weaver	<i>Araneus diadematus</i>
	Spiny water flea	<i>Bythotrephes longimanus</i>
	Knobbedlip fairy shrimp	<i>Eubbranchipus bundyi</i>
	Longtail tadpole shrimp	<i>Triops longicaudatus</i>

* = be able to distinguish the larvae/naiads of these species as well

Part 2: An arthropod collection that is brought to the **regional** tournament (not the practice tournament). The collection may either be pinned or presented as photographs of the actual specimen that the student found, but not a mix.

General requirements

- Specimens that can be found in the Great Lakes region (*not limited to species in Table 2*)
- **No specimens kept as pets or available from pet stores/supply houses**
- The team number and students' names should be clearly identifiable on the collection.
- An immature specimen (not adult) of a species which undergoes gradual (**paurometabolous**) metamorphosis will be accepted. However, an immature specimen of a species which would undergo either complete (**holometabolous**) or incomplete (**hemimetabolous**) metamorphosis will not be accepted. (**Refer to the Amazing Arthropods Study Guide for more details on the distinctions among the types of metamorphosis**)
- All specimens were collected or photographed within the prior year of the competition, and by members who are actively studying the Arthropod event, including Alternate team members. Adults are not team members.

(*continued*)

- All specimens or photos must bear collection data, associated with each individual specimen. Collection data should be on a paper card below pinned specimens or photo. Labels must consist of the following data:
 1. Date collected (month, day, year)
 2. Location collected (State, County, and nearest City)
 3. Brief behavior or habits observed during collection
 - For instance, you could say it was eating a leaf, or swimming in a pond.
 4. Name of collector
- All specimens should be identified to Class. Further, all specimens in Class Insecta should be identified to Order.
- Specimens should be grouped by Class first, then sub-grouped by Order (insects only). No further identification below this level is needed (or wanted!) for this event.

Requirements specific to pinned collections

- Collections should be housed in a sturdy cardboard or wooden box with a lid, not to exceed 16.5" x 19". Styrofoam or similarly porous and flexible material should be placed on the bottom for the pins to stick into.
- Professional insect pins must be used (#2 is an appropriate size).
- Professional vials may be used for soft-bodied specimens, but not other specimens.

Requirements specific to photographic collections

- The collection should be housed in a photo album or combined onto a poster, not to exceed 24" by 36".
- List the camera you used to take the pictures, including lenses.
- Photos must be in focus and allow for proper identification of the specimen (showing necessary features, like number of legs, wings, etc.) **and cropped to reduce excess background.**
- Photos must be of only one specimen.

SCORING:

Test: Approximately $\frac{2}{3}$ of the total score

- Each question may be assigned a value of 2 or 3 points, based on question difficulty.

Collection: Approximately $\frac{1}{3}$ of the total score

- **4** points for each unique Arthropod Class collected and properly identified (**not including Insecta**)
- **3** points for each unique Insect Order collected and properly identified (up to 10 orders)
- 1 point per specimen (up to 30 specimens). Duplicate specimens will not be counted.
- Up to **20** points for quality of work and adherence to the rules (e.g., a proper size box)

Note: Points may be deducted at the Supervisor's discretion, if it appears that the student misrepresented their Arthropod collection or if it appears that the collection was assembled by an adult.

Tie Breaker

Total points of the tie-breaker, fill-in-the-blank format questions.

SUPPORTING RESOURCES:

These are posted on the Macomb Science Olympiad website:

- Amazing Arthropods Study Guide
- Arthropod Species Student Workbook
- Anatomy Worksheets
- Scoring Rubric

If a rule clarification is posted on the Macomb Science Olympiad website, the supervisor will score this event accordingly. Please visit: <https://macombso.org/arthropods>