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

Students must bring: pencil	**Students may bring:** arthropod collection (*not for practice tournaments*) one 8.5" x 11" 2-sided sheet of notes per team
Students may not bring: cell phone, smart watch	**What we provide:** ZipGrade form
More information and resources may be found at: https://macombso.org/arthropods FAQs are also posted, which clarify how these rules are applied.	

THE COMPETITION:

Part 1: A test consisting of multiple choice**,** matching 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 tiebreaker 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 *(Table 1)*	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 *(Table 2)*	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
- Arthropod life cycle (**mate-finding behaviors**, metamorphosis and **alternatives to egg-laying**)
- Arthropod defenses
- **Arthropod feeding adaptations**
- **Pest control tactics**
- **Economic impacts (e.g., agricultural/ food, forests/wood, etc.)**

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

Table 1: Arthropod Classes and	**Insect Orders**	
Arachnida	Blattodea	Lepidoptera
Branchiopoda	Coleoptera	Mantodea
Chilopoda	Diptera	Megaloptera
Diplopoda	Ephemeroptera	Neuroptera
Insecta	Hemiptera	Orthoptera
Malacostraca	Hymenoptera	Odonata

Table 2: Arthropod Species		
Class: Order	**Common Name**	**Scientific Name**
Insecta: **Coleoptera**	**Hungerford's crawling water beetle**	***Brychius hungerfordi***
	Convergent lady beetle	***Hippodamia convergens***
	Black stag beetle	***Lucanus placidus***
	Emerald ash borer	***Agrilus planipennis***
	Goldenrod soldier beetle	***Chauliognathus pensylvanicus***
	Common Eastern firefly	***Photinus pyralis***
	Eastern-Eyed click beetle	***Alaus oculatus***
	Japanese beetle	***Popillia japonica***
Insecta: **Hemiptera**	**Dog-day cicada**	***Tibicen canicularis***
	Boxelder bug	***Boisea trivittata***
	Green peach aphid	***Myzus persicae***
	Meadow spittlebug	***Philaenus spumarius***
	Large milkweed bug	***Oncopeltus fasciatus***
	Pharaoh cicada aka 17-year locust	***Magicicada septendecim***
	Giant water bug	***Lethocerus americanus***
	Spotted lanternfly	***Lycorma delicatula***
Arachnida	European red mite	*Panonychus ulmi*
	American dog tick	***Dermacentor variabilis***
	Carolina wolf spider	***Hogna carolinensis***
	Long-bodied cellar spider	*Pholcus phalangioides*
	Eastern harvestman	*Leiobunum vittatum*
	Banded garden spider	***Argiope trifasciata***
	Cross orb weaver	*Araneus diadematus*
Branchiopoda	Spiny water flea	*Bythotrephes longimanus*
	Knobbedlip fairy shrimp	*Eubranchipus bundyi*
	Large water flea	***Daphnia magna***

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.
- 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 (**unless date and time are part of the photograph itself**). 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 (e.g., eating a leaf)
    4. Name of collector
- All specimens should be identified to Class. Further, all specimens in Class Insecta should be identified to Order. *No specimens should be identified to genus or species.*
- 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 a good size) for all specimens from Class Insecta, whether directly through the thorax or, if the thorax is too small, through a paper triangle.**
- Professional vials **should be used for Arthropod specimens in all Classes except Insecta**.

Requirements specific to photographic collections

- The collection **must** be housed in a photo album or **put on one poster**, not to exceed 24" by 36".
- List the camera you used to take the pictures **(this, along with the date and time, can be programmed to appear on each picture by most cameras and cell phones; highly recommended)**
- 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 67% of the total score

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

Collection: Approximately 33% 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: (highly recommended)

These are posted on the Macomb Science Olympiad website:

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