

Using Dichotomous Keys to Identify Arachnids and Insects

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Recommended Student Grouping: Individual

BACKGROUND

Point out to students that biologists use a dichotomous key to identify species that have already been discovered, described, classified, and named. Before a dichotomous key can be constructed the classification system on which it is based must be devised.

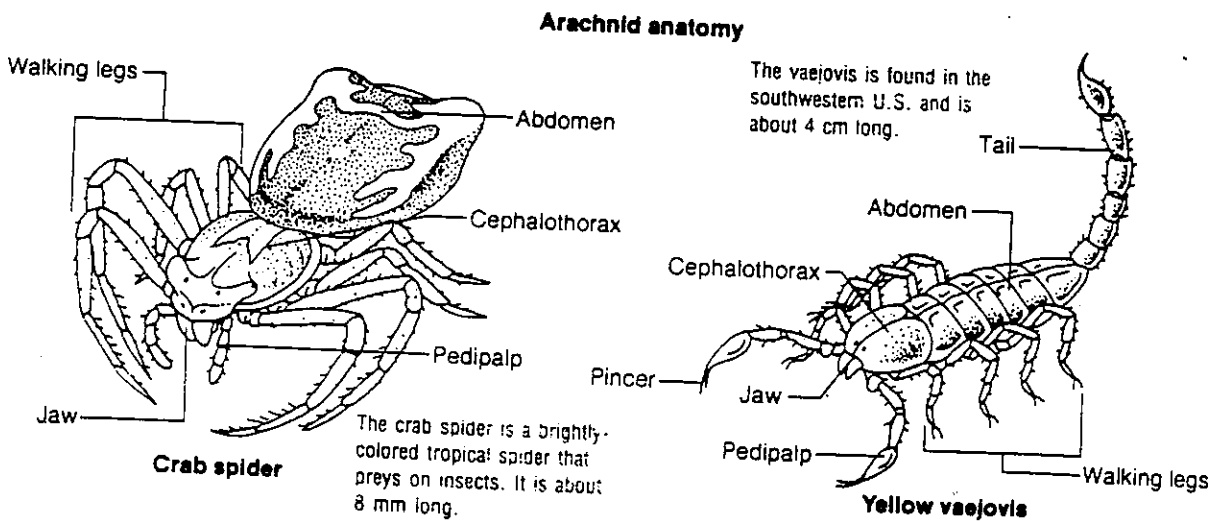
One kind of arachnid, the wind scorpion, is so named because it seems to run as fast as the wind. The sea spider, another arachnid, lives on the ocean floor. The trapdoor spider digs a hole in the ground, covers it with a silk trapdoor, camouflages the trapdoor with leaves, and waits for its prey to walk across the trapdoor. When its prey passes above, the spider feels the vibrations and opens the trapdoor to make the capture. These arachnids are only three examples of the thousands of different types of arachnids. Arachnids, as well as other organisms, are often identified by their physical traits. A *dichotomous key*, based on visible physical traits, can help you identify members of a group of related organisms. Dichotomous means branching into two parts. As you use a dichotomous key, you read pairs of descriptions and decide which description of each pair is true about the organism you are identifying. In this laboratory you will use and make dichotomous keys for the identification of some arachnids and other arthropods.

OBJECTIVES

- Use a dichotomous key to identify types of arachnids.
- Construct a dichotomous key for the identification of some insects.

MATERIALS

Optional: Field guide to arachnids and insects



PROCEDURE A

USING A DICHOTOMOUS KEY

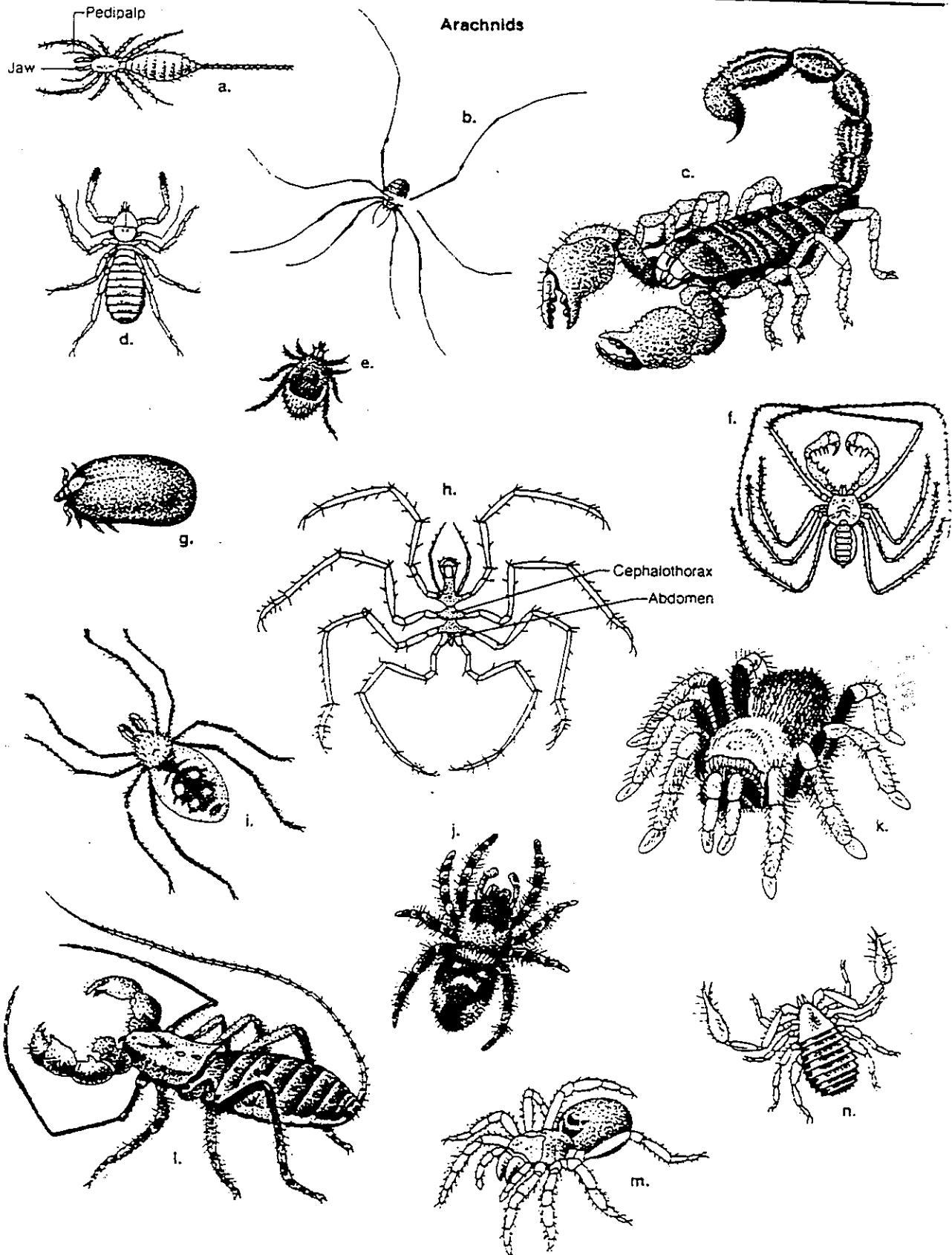
1. Before you use the dichotomous key to identify the arachnids on page 167, review arachnid anatomy by studying the diagrams above. In all arachnids the body is divided into two sections: the *cephalothorax* and the *abdomen*. Find the cephalothorax and the abdomen in each arachnid. Note how these body sections are joined. Observe whether the abdomen is segmented or lacks segments. All arachnids have six pairs of *appendages*, which are attached to the cephalothorax. These appendages include one pair of *jaws*, one pair of *pedipalps*, and four pairs of *walking legs*. Locate the jaws and pedipalps of each arachnid. Notice if *pincers* or *claws* are attached to either of these appendages. Compare leg length to body length. Observe whether any of the pairs of legs are significantly longer than the arachnid's other pairs of legs. Note if either arachnid has a tail or other specialized appendages.

NOTE: All legs attach to the cephalothorax.

2. Use the dichotomous key below to identify the arachnids on the facing page. Choose an arachnid to identify. Beginning with the first pair of statements, decide which statement is true for the arachnid. Proceed to the next pair of statements as directed by the key. When the key lists a name rather than the number of a statement pair, you have identified the arachnid. Write the name of the arachnid on the line below that corresponds to the letter in the picture of that arachnid. Identify the other arachnids in the same manner.

- (a) _____ (b) _____ (c) _____
 (d) _____ (e) _____ (f) _____
 (g) _____ (h) _____ (i) _____
 (j) _____ (k) _____ (l) _____
 (m) _____ (n) _____

Key to Some Arachnids		
1.	a. Cephalothorax or abdomen segmented b. Neither cephalothorax nor abdomen segmented	Go to 2 Go to 9
2.	a. Abdomen with tail b. Abdomen without tail	Go to 3 Go to 5
3.	a. Thick tail with stinger at tip b. Slender tail without stinger at tip	Scorpion Go to 4
4.	a. Pincers on pedipalps; large arachnid b. Pincers on jaws; small arachnid	Whipscorpion Microwhipscorpion
5.	a. First leg long and whiplike b. Legs of about equal length	Whips spider Go to 6
6.	a. Abdomen much smaller than cephalothorax b. Abdomen as large or larger than cephalothorax	Sea spider Go to 7
7.	a. Pedipalps longer than legs b. Pedipalps about the same size or shorter than legs	Pseudoscorpion Go to 8
8.	a. Legs long and stilllike b. Legs not longer than body; pedipalps lack pincers	Daddy longlegs Wind scorpion
9.	a. No narrowing where cephalothorax and abdomen join b. Narrowing where cephalothorax and abdomen join	Go to 10 Go to 11
10.	a. Tiny and covered with spines b. Large, oval body; few spines if any	Mite Tick
11.	a. Entire body and all legs covered with "hair" b. Only parts of body covered with "hair"	Go to 12 Go to 13
12.	a. Pedipalps curved b. Pedipalps straight	Jumping spider Tarantula
13.	a. Large, thick jaws that are close together; cephalothorax covered by plate b. Small thin jaws; long hair-covered legs; cephalothorax covered with short hairs	Trapdoor spider Argiope



ANALYSIS

1. Name three traits common to all arachnids and recognizable in the pictures of each arachnid.

2. State why behavioral traits, such as "preys on small insects" or "spins intricate web," would not be appropriate for many dichotomous keys. When might such trait help you identify an organism?

3. How is "dichotomous" an appropriate word to describe the keys you used and constructed in this laboratory?

4. How is the construction of a key different from the construction of a classification system?
