# Pre-Lab Information

Purpose Conduct an investigation to explore how a dichotomous key can be developed to help classify organisms.

Time Approximately 50 minutes

Question How is a dichotomous key developed?

**Summary** You will create a dichotomous key that can be used to identify arthropods. First, you will observe a group of eight arthropods to become familiar with their appearance. You will then select simple criteria that can be used to write yes-no questions to divide the group into two smaller groups. You will continue the procedure until each arthropod has its own branch.

# Safety

* Behavior in the lab needs to be purposeful.
* Please use plastic arthropods.
* Do not throw the arthropods.
* Do not play with or eat any of the arthropods.

Do not take apart the arthropods.

* Do not place the arthropods in a location intended to scare other students or adults.
* Wash your hands thoroughly after handling all lab materials and making observations.
* Report all accidents—no matter how big or small—to your teacher.

# Lab Procedure

1. **Gather lab materials.**

|  |  |
| --- | --- |
| * Lab guide * Pencil * Ant * Bee * Butterfly | * Dragonfly * Ladybug * Scorpion * Spider * Wasp |

1. **Carefully observe each plastic Arthropod.**
   1. Look for body parts or characteristics that are found in some, but not all, of the specimens. These are the most useful for building a key.
   2. Write the number of each characteristic for each arthropod in Table A of the data section below. This table will help you to group the arthropods. Refer to it as often as necessary.
2. **Use your observations to create a series of yes–no questions about the following characteristics. Write your questions in Table B.**
   1. Wings
   2. Legs
   3. Claws
   4. Stinger
   5. Antennae
3. **Begin drawing your key in Figure A.** 
   1. Turn the paper sideways (landscape) so that you will have enough space to create your key.
4. **Pick a question from Table B below.**
   1. Write the question in Figure A close to the top center of the landscaped page.
   2. Below the question, write “No” on the left and “Yes” on the right.
   3. Remember, you can use Table A to help you answer the questions you picked.
5. **Separate the arthropods into two groups, a “No” group and a “Yes” group.**
   1. Write the names of the “No” arthropods in Figure A under the word “No”.
   2. Write the names of the “Yes” arthropods in Figure A under the word “Yes”.
6. **Extend and finish the key.**
   1. Continue adding key questions and building branches on your key by repeating Steps 5 and 6 until every arthropod has been categorized into its own branch.
7. **Verify that the end of each branch of your key now has only one arthropod name for each “yes” or “no” answer.**

# Data

**Table A:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Legs** | **Visible Wings** | **Visible Antennae** | **Stinger** | **Claws** |
| **Ant** |  |  |  |  |  |
| **Bee** |  |  |  |  |  |
| **Butterfly** |  |  |  |  |  |
| **Dragonfly** |  |  |  |  |  |
| **Ladybug** |  |  |  |  |  |
| **Scorpion** |  |  |  |  |  |
| **Spider** |  |  |  |  |  |
| **Wasp** |  |  |  |  |  |

**Table B:**

|  |  |
| --- | --- |
| **Questions for Classifying the Eight Given Arthropods** | |
| **1** |  |
| **2** |  |
| **3** |  |
| **4** |  |
| **5** |  |
| **6** |  |
| **7** |  |
| **8** |  |

Draw your dichotomous key in the space below.

**Figure A:**

# Follow-Up Questions

Answer the following questions.

1. Can you use the same question in a different branch?
2. How many questions would you need to separate ten arthropods into different branches?