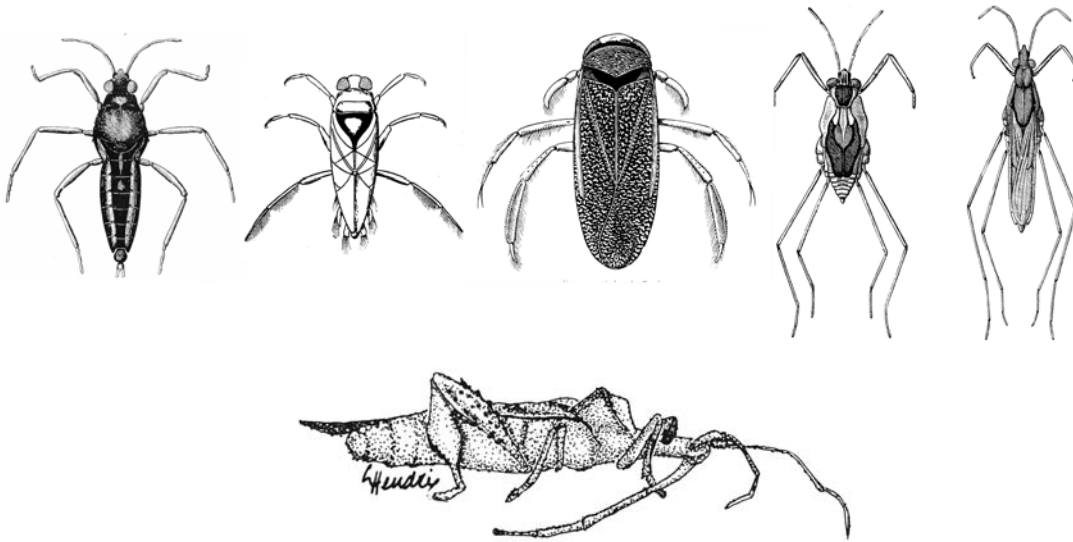


## Student Handout #2- Dichotomous Key for Aquatic Insects

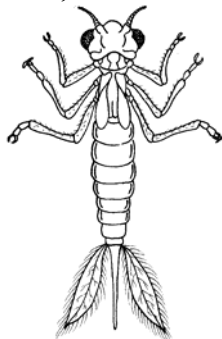
- 1a. More than three pair of legs..... **not an insect**
- 1b. Zero to three pair of legs only ..... **2**
  
- 2a. With obvious wings..... **adult insect (see adult key)**
- 2b. Without wings or with wing buds only ..... **3**
  
- 3a. Wing buds present; not worm-like..... **4**
- 3b. No wing buds; may be worm-like ..... **8**
  
- 4a. Long, piercing mouthpart begins at the top of the head; ranges in size from 2 to 60mm (true bugs) ..... **Hemiptera (figure 1)**
- 4b. No piercing mouthpart..... **7**



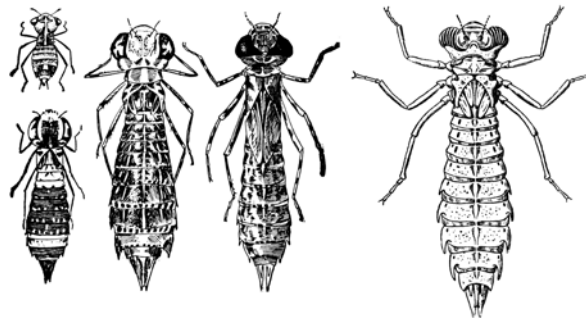
**Figure 1.**

- 5a. Underside of mouth with an extension arm that may cover face like a basket, or be flat against bottom of head, but usually with ‘teeth’ (jagged edges)..... **6**
- 5b. Lower mouthparts not obviously enlarged or able to be extended ..... **7**

- 6a. Tip of Abdomen with three leaf like gills; ranges in size from 13 to 68mm, not including antennae or tails (damselflies)..... **Odonata (figure 2)**
- 6b. Tip of Abdomen with terminal triangular-shaped spines; ranges in size from 13 to 68mm, not including antennae or tails (dragonflies)..... **Odonata (figure 3)**



**Figure 2.**

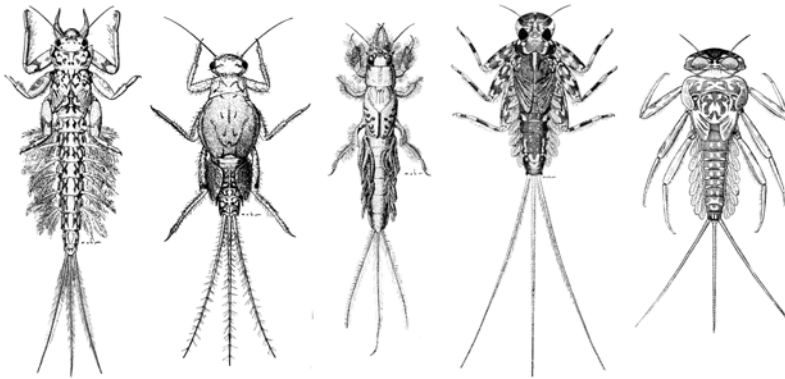


**Figure 3.**

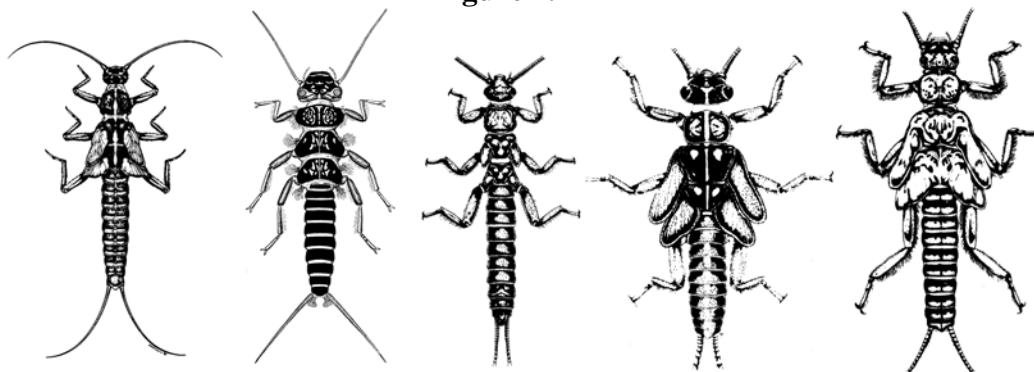
- 7a. Abdomen with lateral gills that are 'leaf-like' or 'bushy'; gills can also look like a feather duster located all along the sides of the abdomen; also tip of abdomen with three tails' (rarely with only two); ranges in size from 2 to 32mm, not including antennae or tails (mayflies).....

..... **Ephemeroptera (figure 4)**

- 7b. Thorax only with gills, never on sides of abdomen; look for feathery or "leaf-like" gills under the "armpits"; tip of abdomen with two 'tails'; ranges in size from 5 to 70mm, not including antennae or tails (stoneflies) ..... **Plecoptera (figure 5)**

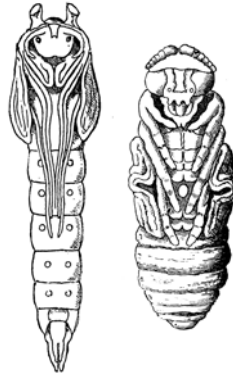


**Figure 4.**



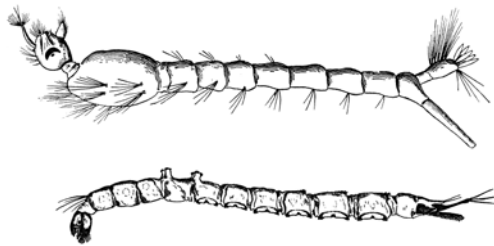
**Figure 5.**

- 8a. Mummy-like; wings, legs, antennae held tight against body wall, may or may not have a case or silken cocoon.....**pupae (figure 6)**
- 8b. Body worm-like, maggot-like, or caterpillar-like; zero or three pair of ‘true’ legs ..... **9**



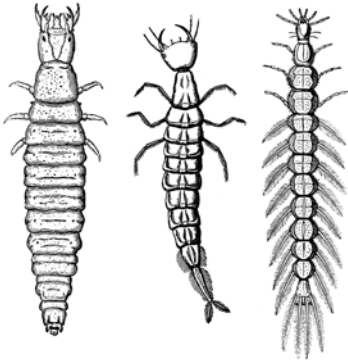
**Figure 6.**

- 9a. No true legs on the thorax; may have “false legs” on the abdomen .....**10**
- 9b. Three pair of true legs present on the thorax.....**12**
  
- 10a. Worm-like body without a distinct head capsule; ranges in size from 2 to 25mm, occasionally 100mm as mature larvae (flies).....**Diptera (figure 7)**
- 10b. Worm-like body with a distinct head capsule ..... **11**

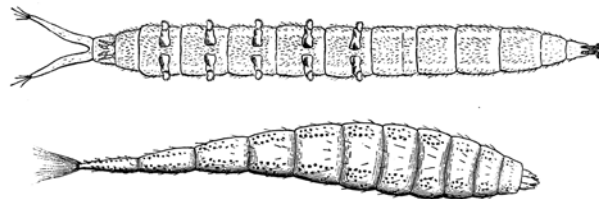


**Figure 7.**

- 11a. Worm-like body with a distinct head capsule and no structures on the end of the abdomen; ranges in size from 2 to 70mm, excluding tails .....**Coleoptera (figure 8)**
- 11b. Worm-like body with a distinct head capsule and a breathing tube or other structure at the end of the abdomen; ranges in size from 2 to 25mm, occasionally 100mm as mature larvae.....**Diptera (figure 9)**

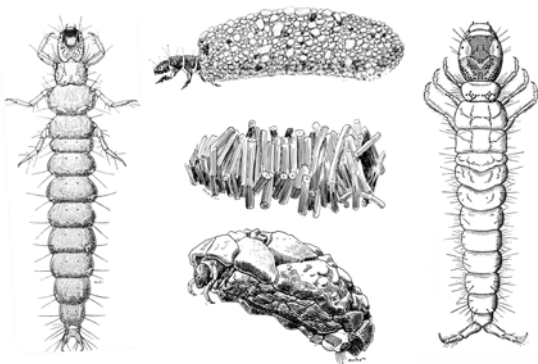


**Figure 8.**

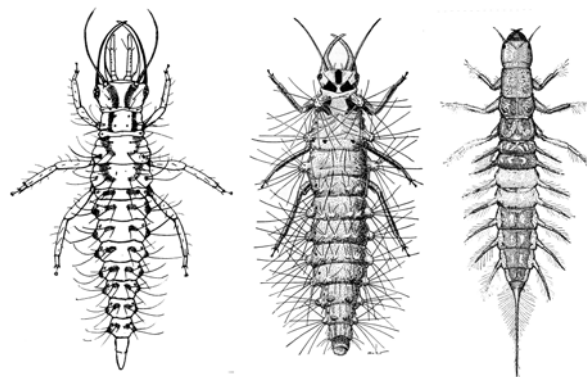


**Figure 9.**

- 12a. Large head with strong mandibles; with eight pair of gills, each extending laterally from an abdominal segment; ranges in size from 10 to 90mm (hellgrammites).....**Neuroptera (figure 10)**
- 12b. Worm-like body with or without a case that can be made of sand, pebbles, or sticks; ranges in size from 2 to 43mm (caddisflies) .....**Trichoptera (figure 11)**



**Figure 10.**



**Figure 11.**

# Student Data Sheet

Microhabitat type:

<b>Order</b>	
<b>Coleoptera</b>	
<b>Diptera</b>	
<b>Ephemeroptera</b>	
<b>Hemiptera</b>	
<b>Neuroptera</b>	
<b>Odonata</b>	
<b>Plecoptera</b>	
<b>Trichoptera</b>	
<b>unknown</b>	

# Student Data Sheet

## Microhabitat type:

classification	
<p><b>skaters</b>                      adapted to skating across the surface of the water with their tarsi specialized for pushing water to propel them forward in pools within the stream</p>	
<p><b>divers</b>                      adapted for swimming in mountain stream pools by "rowing" with their hind legs</p>	
<p><b>swimmers</b>                      adapted for swimming in pools and runs much like fish and may cling to submerged objects in between bouts of swimming</p>	
<p><b>clingers</b>                      adapted with long, curved tarsal claws, dorsoventral flattening, and ventral gills arranged as suckers for attaching to surfaces in stream riffles or they can have a fixed retreat</p>	
<p><b>sprawlers</b>                      adapted for staying on top of leaves and debris or fine sediments found in pools within the stream while keeping their respiratory surfaces free of silt</p>	
<p><b>climbers</b>                      adapted for moving up roots, sticks, and branches along the stream's edge (along runs) or stream bank undercuts (in pool areas)</p>	
<p><b>burrowers</b>                      adapted to living in the fine sediments of stream pools, may even construct burrows of sand grain tubes which may extend above the surface of the substrate</p>	
<p><b>unknown</b></p>	

## References

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## Images

Images used in this key are either public domain images from the following sources:

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