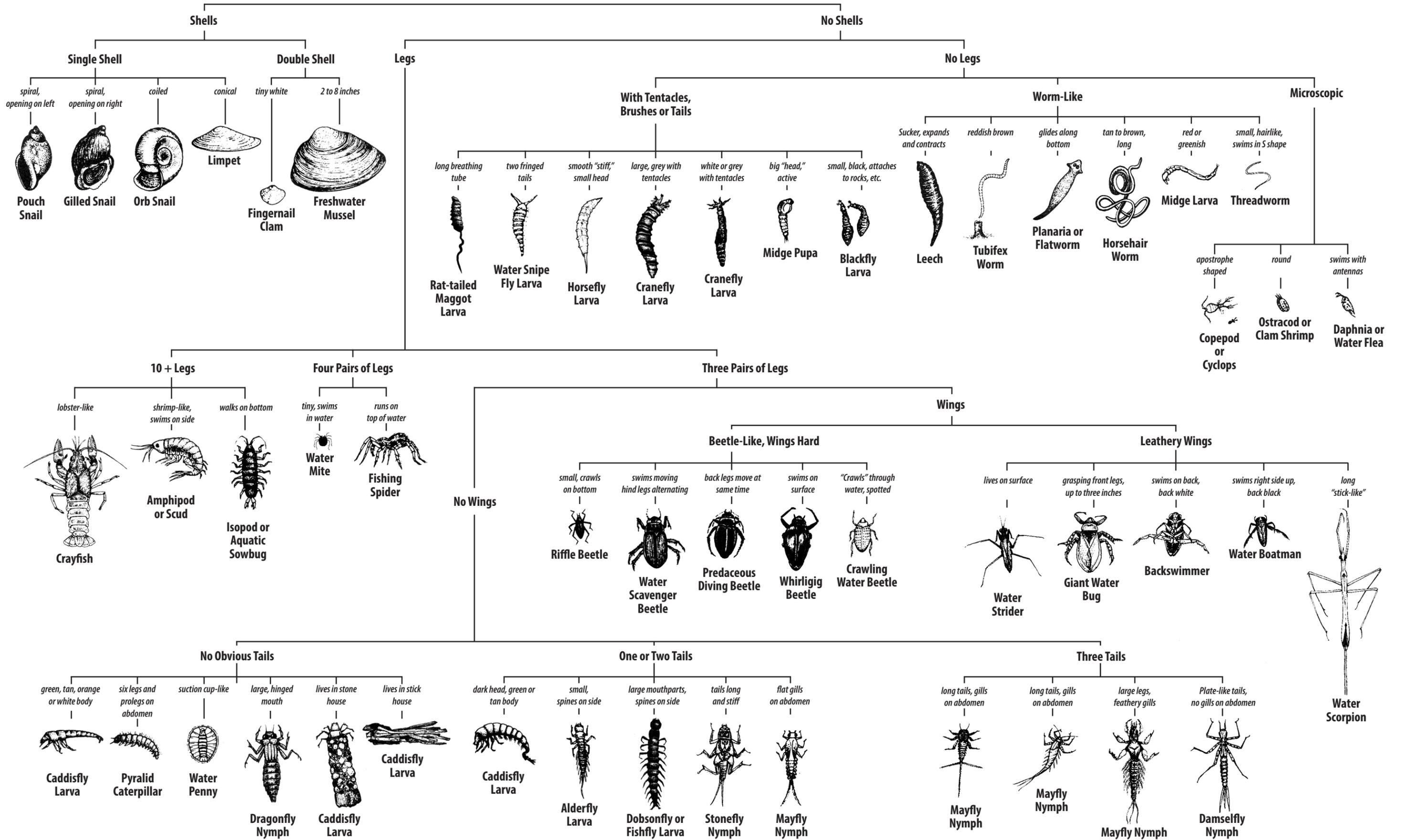


# Key to Macroinvertebrate Life





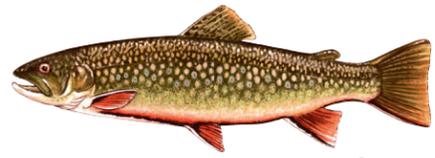
# Pond and Stream Study Guide

## Interpreting Physical and Chemical Factors

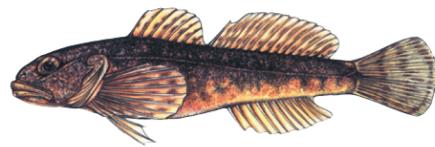
**Water Temperature and Fish Communities** - For more information on fish temperature and habitat preferences, visit [fishandboat.com](http://fishandboat.com).

### COLDWATER FISH

Thrives and reproduces in water temperature **less than 70 degrees**. The preferred temperature range for these fishes is **between 50 and 65 degrees**.



Brook Trout



Slimy Sculpin



Rainbow Trout



Brown Trout



Blacknose Dace



Longnose Dace

Species shown are not in proportion to each other.

### COOLWATER FISH

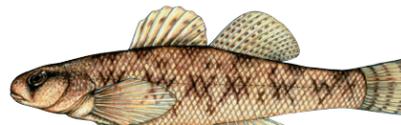
Thrives and reproduces in water temperatures **less than 80 degrees but warmer than 60 degrees**. The preferred temperature range for these fishes is **between 65 and 70 degrees**.



Fallfish



Creek Chub



Tessellated Darter



Yellow Perch



White Sucker



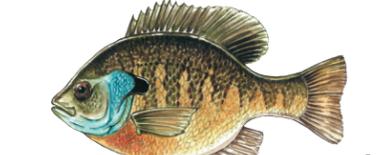
Smallmouth Bass

### WARMWATER FISH

Thrives and reproduces in water temperatures **warmer than 80 degrees**. The preferred temperature range for these fishes is **between 70 and 85 degrees**.



Largemouth Bass



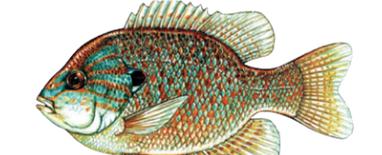
Bluegill



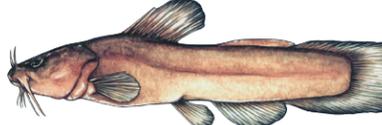
Channel Catfish



Rock Bass



Pumpkinseed



Margined Madtom



Brown Bullhead

## Dissolved Oxygen (DO) Dissolved Oxygen Requirements by Fish Community

Cold Water Fishes: 6 mg/l and above

Warm Water Fishes: 5 mg/l

### Solubility of Dissolved Oxygen

Solubility: Amount of dissolved oxygen that distilled water can hold at given temperature

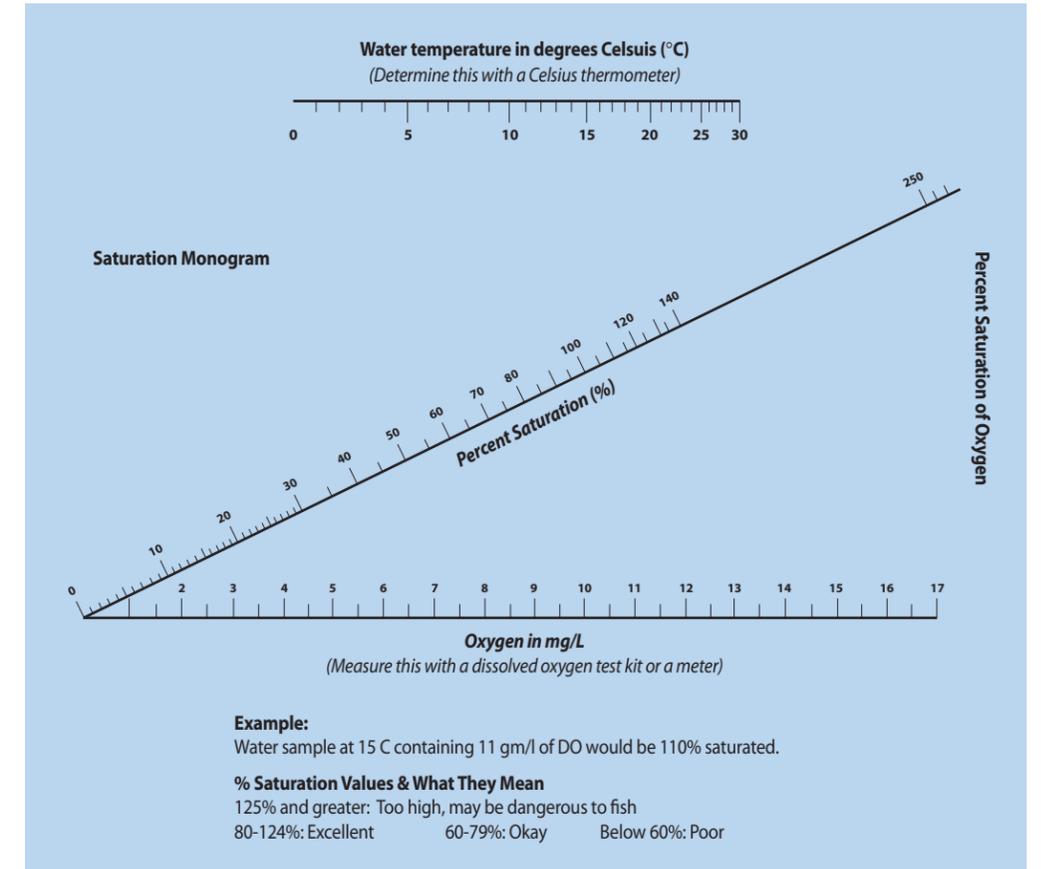
Temperature (C°): Solubility (mg/l)

0:	14.6
1:	14.2
3:	13.5
4:	13.1
5:	12.8
6:	12.5
7:	12.2
8:	11.9
9:	11.6
10:	11.3
11:	11.1
12:	10.9
13:	10.6
14:	10.4
15:	10.2
16:	10.0
17:	9.8
18:	9.6
19:	9.4
20:	9.2
21:	9.0
22:	8.9
23:	8.7
24:	8.6
25:	8.4
26:	8.2
27:	8.1
28:	7.9
29:	7.8
30:	7.7

### Dissolved Oxygen Percent Saturation

#### Directions

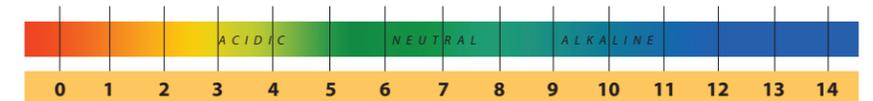
- Determine water temperature in degrees C, and find that value on upper (temperature) scale. \*To convert F to C: [(F-32) x 5]/9=C.
- Determine dissolved oxygen and find that value on the lower (DO) scale.
- Using a straight edge (ruler, piece of paper), draw a line from the temperature value to the dissolved oxygen value. The point at which the line crosses the middle (saturation) scale is the percent saturation of oxygen.



Adopted from: Water, Water Everywhere: Water Quality Factors Reference Unit, HACH, Inc., Loveland CO, 800-227-4224.

## pH and Aquatic Organisms

pH Scale



### Tolerant ranges for certain species

Mayfly	5.5 to 7.5	Brown Trout	5.0 to 9.5	Common Carp	5.0 to 9.0
Caddisfly	5.5 to 7.5	Brook Trout	4.5 to 7.5	Channel Catfish	5.0 to 10.0
Stonefly	5.5 to 7.5	Yellow Perch	4.5 to 7.5	Bullfrog	4.5 to 7.5
Snails, Clams, Mussels	6.0 to 9.0	Smallmouth Bass	5.5 to 7.5	Wood Frog	4.0 to 7.5
Crayfish	5.5 to 7.5	Pumpkinseed	5.0 to 7.5	American Toad	4.5 to 7.5
Rainbow Trout	5.5 to 9.5	Fathead Minnow	6.0 to 7.5	Spotted Salamander	5.0 to 9.5

### Alkalinity

(Calcium carbonate:) CaCo<sub>3</sub>

### Freestone Streams

10 mg/l or less: Very sensitive to acid precipitation  
10-20 mg/l: Somewhat sensitive to acid precipitation  
20mg/l or greater: Not sensitive to acid precipitation

### Limestone Streams

75 mg/l or greater