

Water Temperature Change

Primary Importance:

Temperature affects metabolic rates and reproductive function of many aquatic organisms. Temperature also affects other chemical parameters, such as the amount of dissolved oxygen in water. *Dissolved oxygen levels are lower at higher temperatures.*

Problem

Aquatic organisms have narrow optimal temperature ranges. In particular, oxygen gas is not as soluble in warm water as it is in cold water, so it is easier for biological processes to run out of oxygen.

Causes

- ❖ Loss of shading in the riparian zone can allow temperature to increase due to sunlight hitting the water.
- ❖ In summer, passage through shaded sections can lead to cooling. This occurs because soils are cooler than air during much of the summer.
- ❖ Release of water from ponds or other exposed standing water sources can increase temperatures.
- ❖ Municipal wastewater and industrial discharges can have elevated temperatures.

Instructions:

CHECKLIST

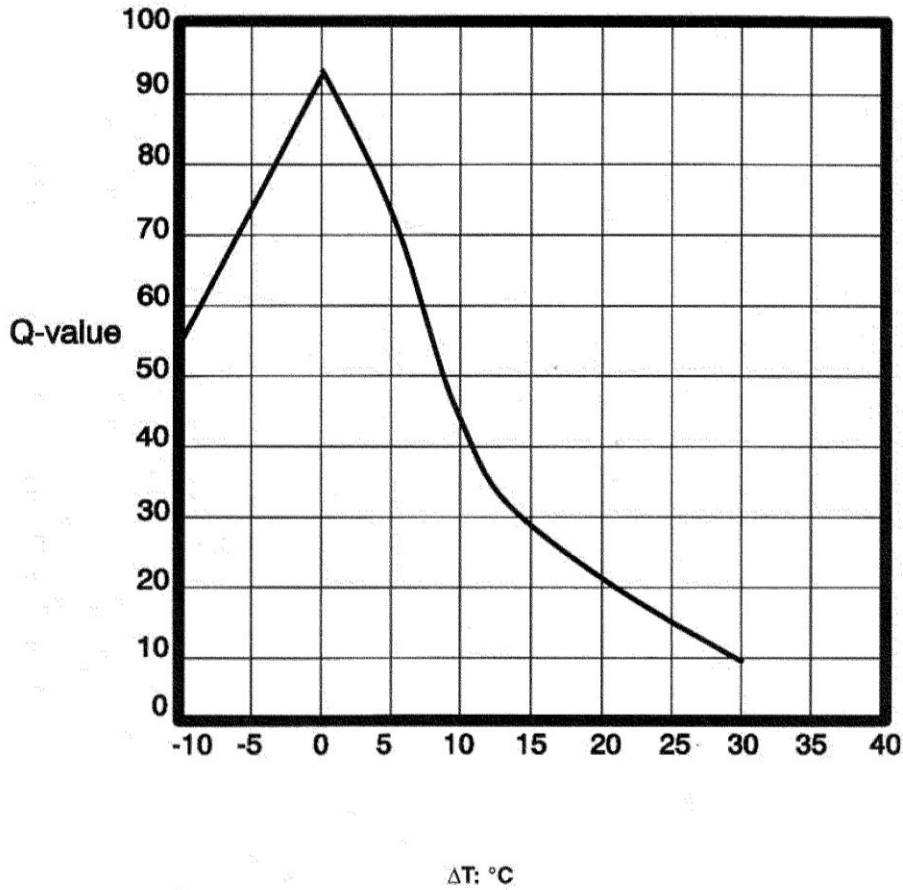
- Celsius thermometer (Don't forget to convert if using Fahrenheit readings!)
- Testing Instructions
- Data Sheets

1. At the sampling site, lower the bottom half of the thermometer below the water's surface (the same depth at which the other tests were performed). If possible, obtain the temperature reading in an area where the water is flowing.
2. Swirling gently, hold the thermometer in the water for approximately two minutes or until the thermometer reading stabilizes.
3. Record your reading in **degrees Celsius**.
(Note: Use the following equation to convert Fahrenheit to Celsius.)
$$C = (F - 32.0) / 1.8 \quad \text{OR} \quad F = (C \times 1.8) + 32$$
4. Choosing a portion of the stream with roughly the same degree of shade and velocity as in step 1, conduct the same test approximately 1 mile upstream as soon as possible.
(Note: Use the same thermometer in order to reduce the possibility of equipment error.)
5. Calculate the difference between the upstream and downstream results. Record the temperature change in degrees Celsius.

EXAMPLE: 15°C downstream -14°C upstream = 1°C temperature change

TYPICAL WATER TEMPERATURE CHANGE = <5°F

Water Temperature Change Q-values



Change in Temp. (°C)	Q-Value
-10	56
-7.5	63
-5	73
-2.5	85
-1	90
0	93 (max)
1	89
2.5	85
5	72
7.5	57
10	44
12.5	36
15	28
17.5	23
20	21
22.5	18
25	15
27.5	12
30	10