



## # 538 Environmental and Outdoor Water Sciencefaircenter.com Study Kit

Each water sample is tested for this Set of parameters:  
pH, Alkalinity, Water Hardness,  
Total Dissolved Solids (TDS)  
(4 tests per Set)

Log onto  
[www.sciencefaircenter.com/documentation.tpl](http://www.sciencefaircenter.com/documentation.tpl)  
for additional information on this study kit.

Find more water information at [www.sciencefairwater.com](http://www.sciencefairwater.com) (a web work in progress).

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## pH Scales



### # 110 pH Testing of Water

Colorimetric test strips. (1 test per strip)

This pH test is very versatile in that it can be used for Drinking Water testing, food processing, environmental applications or in any other water matrix.

pH is short for “Power of Hydrogen”. The balance of positively charged and negatively charged hydrogen ions in drinking water determines pH.

Water that has a low pH is acidic or aggressive and can corrode plumbing resulting in metal ions being present in drinking water and damages fixtures and pipes.

Water that has a high pH is basic and will leave scale in pipes and fixtures.

This test features two test pads both measuring at the same range using different color indicators. This makes color matching easier on the Color Comparator Chart than with other colorimetric tests.

The test reports water pH at the following levels:  
2.0, 3.0, 4.0, 5.0, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10, 11, and 12  
Results are obtained from this test in 1 minute.

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## **Note:**

These pH test strips perform optimally in water with a Total Alkalinity above 80 mg/L or ppm. Water highly saturated with dissolved solids or highly buffered samples will give elevated results for pH.

## **Note:**

National Secondary Drinking Water Regulations set forth by EPA recommend a pH level 6.5 - 8.5 .

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# Total Alkalinity



0

40

80

120

180

240

mg/L or ppm



## #105 TOTAL ALKALINITY of WATER

Colorimetric test strips. (1 test per strip)

Total Alkalinity is a fundamental parameter and water testing. Total Alkalinity indicates the buffering capacity of natural waters. A water is said to be buffered if the pH is not changed greatly by addition of acids or bases. The most effective buffering action is within the pH range of water from near 6.0 to about 8.5.

Most natural waters are buffered to some extent by reactions that involve Dissolved Carbon Dioxide (CO<sub>2</sub>). This Carbon Dioxide is an indispensable reservoir of carbon for photosynthesis. Thus, the productivity's of water can be correlated with alkalinity and the buffering system.

The Color Comparator Chart for this test allows you to read Total Alkalinity in mg/L or ppm.

This test reports total alkalinity concentrations in water at:  
0, 40, 80, 120, 180 and 240 mg/L or ppm.

Results are obtained from this test in 30 seconds.

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## Total Hardness (As CaCO<sub>3</sub>)



### # 100 TOTAL WATER HARDNESS

Colorimetric test strips. (1 test per strip)

Water Hardness is composed of mostly calcium and magnesium. The water hardness comes from naturally occurring minerals in the local and regional geology being dissolved by water.

Hardness is a key water parameter and its control is important to assure proper water quality. Low Hardness (Soft water) can contribute to corrosive water. High Hardness (Hard water above 400) can lead to clarity and scaling problems. Water softeners are used to reduce Total Hardness of water.

Testing for hardness in tap water is very common and is very quick and easy with these test strips. The Color Comparator Chart for this test allows you to read Total Hardness in mg/L or ppm.

This test reports calcium hardness concentrations in water at 0, 40, 80, 120, 180, 250, 425, 1000 mg/L or ppm.

Results are obtained from this test in about 5 seconds.

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## Background Information

**Total Hardness (TH)** is a measure of the total amount of calcium and magnesium that has naturally leached into the water during its journey through the watershed. In the U.S. water hardness is most often reported as milligrams per liter (mg/L) or parts per million (ppm) as calcium carbonate (CaCO<sub>3</sub>).

It is difficult to produce soap suds in water with high levels of calcium and magnesium ions, hence the term “hardness”.

In addition to reducing the effectiveness of soaps and detergents, hard water may cause an insoluble scale to form on fixtures and on the inside of pipes. Scale formation depends on several factors, one of which is pH.

The EPA does not regulate the levels of hardness in the water supply. There are, however, generally recognized levels that describe the amount of hardness in a water sample:

Hardness as Calcium carbonate (ppm)	Classification
0-60	Soft
61-120	Moderately Hard
121-180	Hard
>180	Very Hard



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## Total Dissolved Solids (TDS)



<50

100

250

500

750

mg/L or ppm

### #145 Total Dissolved Solids in Water

Colorimetric test strips. (1 test per strip)

Testing for Total Dissolved Solids (TDS) in tap water is very common and is very quick and easy with these test strips. The EPA Secondary Drinking Water Standard for for TDS is 500mg/L or ppm.

The color chart for this test allows you to read TDS in milligram/L or ppm.

The Color Comparator Chart for this test reports Total Dissolved Solids levels in water at:

0, 50, 100, 250, 500, 750 mg/L or ppm.

(Note: concentration units are milligrams per Liter or parts per million).

Results are obtained from this test in about 30 seconds.



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