LIMNO Data Sheet **Lake Investigations in Michigan and Nature Observations**

Date:_____ Lake:_____ Group:_____

Weather/Wave conditions:_____

Turbidity tube: _____ Secchi disc reading: _____ Turbidity test:_____

Color:

l II lll lV V Vl Vll Vlll IX X XI Xll XIII XlV XV XVl XVll XVIII XIX XX XXI

Condutivity: _____ Nitrates: _____ Phosphates: _____

Alkalinity: _____ pH:_____

Algal concentration: _____

Macrophyte (plants) observations: _____

Dissolved Oxygen

Shallow D.O.: _____ Shallow temperature: _____ % Saturation: _____

Deep D.O.: _____ Deep temperature: _____ % Saturation: _____

Sediments found (% of each): _____ Sand; _____ gravels; _____ muck

Macroinvertebrates: (check all found in this lake today)

❑ snails ❑ scuds ❑ dragonfly larva ❑ damselfly ❑ water boatman

❑ backswimmer ❑ caddisfly

Invasive species found: _____

Other observations:

Number of characteristics that are typically:

Oligotrophic _____
(relatively low in plant nutrients and containing abundant oxygen in the deeper parts)

Mesotrophic _____
(having a moderate amount of dissolved nutrients)

Eutrophic _____
(rich in nutrients that support a dense plant population, the decomposition of which kills animal life by depriving it of oxygen)

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Lake Investigations in Michigan and Nature Observations (LIMNO)
Data Collection

Test	Units	Oligotrophic	Mesotrophic	Eutrophic
Secchi disc / turbidity tube	meters	≥ 4	between 2 - 4	≤ 2
Secchi disc	feet	≥ 7	5 - 6	≤ 5
Turbidity tube	NTU or JTU*	<1.2	1.3 - 3.0	> 3.1
Color	Forel-Ule Scale	1 - 11	12 - 18	19-22
Conductivity	microSiemens	0 - 299	300 - 450	> 450
pH (acid-base)	pH Scale	> 8.0	7.7 - 8.0	< 7.7
Total Phosphorus	micrograms/L	0 - 17	18 - 29	≥ 30
Chlorophyll a	micrograms/L	2 - 7	8 - 11	≥ 11
Termperature (bottom)	degrees C	4 - 10	11 - 15	> 15
Dissolved Oxygen (bottom)	mgl	> 7	4.0 - 6.9	< 4.0
Plankton Density		> 66	30 - 65	0 - 29
Bottom Sediments		Sand	Sand & Organic	Organic
Blood Worms		No		Yes

*Nephelometer or
Jackson Turbidity Units

Lake and Pond Color

A variety of natural and human caused conditions can produce color in lakes and ponds. Here is a list of commonly seen colors and causes for those colors.

Wine or yellow/orange or tea color - tannins from leaf fall, especially oaks
Murky/muddy - silt/clay from stirred bottom or watershed erosion
Green - algae
Yellow-green - from certain planktonic algae
Pea soup green - blue green algae (cyanobacteria) which form scum if overpopulated

Less common:
Purple/pink/reddish - purple sulfur bacteria
Red and brown - iron oxidizing bacterial slime or sulfur bacteria
Black or gray - manganese or reflection pond dye depending on location
Bright blue - pond dye used in golf course ponds, parks, and fountains

Surface:
Silvery white (no rainbow appearance) - neuston film; community of microorganisms and bacteria
Silvery with rainbow sheen - oil or petroleum

Turbidity Tube Conversion Chart

The Turbidity Conversion Chart converts the measured value in cm to Nephelometric Turbidity Units (NTUs). This is the official unit of measurement to quantify how much light is scattered due to the suspended sediments. You can convert your turbidity tube reading from a height to NTUs using the chart below.

Distance from bottom of tube (cm)	NTUs
< 6.25	> 240
6.25 to 7	240
7 to 8	185
8 to 9.5	150
9.5 to 10.5	120
10.5 to 12	100
12 to 13.75	90
13.75 to 16.25	65
16.25 to 18.75	50
18.75 to 21.25	40
21.25 to 23.75	35
23.75 to 26.25	30
26.25 to 28.75	27
28.75 to 31.25	24
31.25 to 33.75	21
33.75 to 36.25	19
36.25 to 38.75	17
38.75 to 41.25	15
41.25 to 43.75	14
43.75 to 46.25	13
46.25 to 48.75	12
48.75 to 51.25	11
51.25 to 53.75	10
53.75 to 57.5	9
57.5 to 60	8
Over the top	6

Determining Percent Saturation of Oxygen

Determine water temperature and oxygen concentration in ppm. Draw a straight line from oxygen level on bottom scale and temperature on top scale. Read the % saturation where this line crosses the diagonal line.