LESSON PLAN

Diane Johnson – Space Coast Middle School, Cocoa, FL

Lesson Title: Differences in Water Quality / Condition in Oligotrophic and Eutrophic Bodies of Water

Grade Level: 10-12 (or High School Research, Adult Education)

Topic: Water quality in an oligotrophic body of water compared to a eutrophic body of water

Time Required: 6-9 months (ongoing), possibly a school year (for long-term analysis)

Objectives:

1. Learn to accurately test water conditions.
2. Compare/contrast results of 2 tested bodies of water.
3. Collect and record data in an organized, accurate fashion.
4. Determine if plant/animal life is healthy or more productive under certain conditions.
5. Draw hypotheses/conclusions on results/data.

Materials:

Water quality test kits for nitrite/nitrate, pH, ammonia, ortho-phosphate, dissolved oxygen
Thermometer
Secchi disk
Data and graph sheets
Computer (to store data)

Procedure:

1. Students will define and test the difference between an oligotrophic ("new") and a eutrophic ("old") body of water (pond or lake).
2. By using the water quality test kits, thermometer, and Secchi disk with teacher assistance and prior instruction, students will properly draw water samples, analyze them, and complete site surveys on a monthly basis for each of the sites. Turbidity, pH, air temperature, and water temperature will be performed on-site during each sampling period.
3. Students will transfer their data onto data collection sheets (see below) for each field site.
4. The data will then be inputted into a computer spreadsheet program each month. Here, the data will be plotted and further analyzed.

Data:

Data Collection Chart

Site Survey/Comments

Location of site _____

Weather conditions and % cloudiness _____

Wind speed/direction _____

Nearby land use _____

Water type _____

Wildlife _____

Fish and insects present _____

Plant and algal growth _____

Water level _____

Time of day _____

Precipitation _____

Physical observations of water _____

Temperature

Air _____ **°C** **Water** _____ **°C**

Depth _____ **m**

Secchi depth	_____ **m**	**pH**	_____
Dissolved oxygen	_____ **mg/L**	**Ammonia**	_____ **mg/L**
Phosphate	_____ **mg/L**	**Nitrite**	_____ **mg/L**
Nitrate	_____ **mg/L**	**Copper**	_____ **mg/L**
Lead	_____ **mg/L**		

** **Remember – All samples must be cooled to 4 °C if the tests are not to be done on-site.**
Dissolved oxygen, pH and temperature must be completed on-site.

Questions:

1. **Does the eutrophic body of water have less or more dissolved oxygen?**
2. **Is there any evidence of fertilizer runoff or decaying matter at either site? How would this observation affect your results?**
3. **Any fish dead or floating? Is this observation correlated with in your chemical analyses?**
4. **Is the oligotrophic water more clear and deeper than the eutrophic one? Explain why or why not.**