Chemical Monitoring, Part A

Learning Module #5

**How do chemical properties of water relate to stream health?**

Directions:

* For this activity, you will be graphing relationships between chemical water quality parameters and other variables. You will also be answering question associated with each graph.
* Please use a different sheet of graphing paper for each graph. Answer the questions in the space provided.
* One you graph the points, connect you points with a line.
* Don’t forget to label the x and y-axes!

**Graph 1**

|  |  |
| --- | --- |
| Maximum Temperature (°C) | Salamander abundance |
| 22 | 4.2 |
| 24 | 3.4 |
| 26 | 2.5 |
| 28 | 2 |
| 30 | 1.5 |
| 32 | 0.9 |
| 34 | 0 |

Graph 1- Question 1: Describe the relationship between maximum temperature and number of salamanders.

Graph 1 - Question 2: Based on the graph, what do you think will happen to salamanders as temperatures become warmer due to climate change?

**Graph 2**

|  |  |
| --- | --- |
| Temperature (°C) | Dissolved Oxygen (mg/L) |
| 0 | 14.76 |
| 5 | 12.97 |
| 10 | 11.5 |
| 15 | 10.29 |
| 20 | 9.29 |
| 25 | 8.47 |
| 30 | 7.77 |
| 35 | 7.15 |

Graph 2 – Question 3: Describe the relationship between water temperature and dissolved oxygen.

Graph 2 – Question 4: Why might oxygen be important to organisms living in a stream? What might happen if dissolved oxygen gets too low?

**Graph 3**

|  |  |
| --- | --- |
| pH | Rainbow trout abundance |
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 8 |
| 7 | 10 |
| 8 | 10 |
| 9 | 7 |
| 10 | 0 |
| 11 | 0 |
| 12 | 0 |

Graph 3 – Question 5: Describe the relationship between pH and number of rainbow trout.

Graph 3 – Question 6: What range of pH can rainbow trout tolerate?

**Graph 4**

|  |  |
| --- | --- |
| Percent Impervious Surface | Conductivity (µS/cm2) |
| 0 | 20 |
| 10 | 32 |
| 20 | 58 |
| 30 | 112 |
| 40 | 158 |
| 50 | 162 |
| 60 | 220 |
| 70 | 290 |

Graph 4 – Question 7: What do you think “conductivity” in a stream means? Take your best guess!

Graph 4 – Question 8: Describe the relationship between impervious surface and conductivity.

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**Guided Notes**

Temperature

* Definition: how hot or cold the water is
* Measured in:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Importance:
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Georgia Standards: Less than 32.2°C (90°F)

Dissolved oxygen

* Definition: how much oxygen is dissolved in water
* Measured in: **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Importance:
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Georgia standards: Average of 5 mg/L; minimum 4 mg/L

Temperature and Dissolved Oxygen (DO)

* **Inversely** related to temperature
  + As temperatures go up, DO goes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + As temperatures go down, DO goes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* DO may decrease due to:
  + Rising temperatures
  + An overload of decaying organic matter
  + Slow moving, deep water

pH

* Definition: a measure of hydrogen ions (H+)
* Measured in:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Importance:
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Georgia standards: 6-8.5

Conductivity

* Definition: a measure of water’s ability to pass electrical current; Indicate presence of ions in water
* Measured in: **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Importance:
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Georgia standards: No regulated levels in Georgia; ranges from 50-1500 µS/cm

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**Closing Activity**

Question 1:

Question 2:

Question 3:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_