**DO NOT WRITE ON THIS PAPER!!!!!!!! DO NOT TAKE THIS PAPER WITH YOU!!!!!!!!!**

**“Indicators of Water Quality” Foldable**

\*Glue your foldable onto page \_\_\_\_\_ of your interactive notebook.

\*On page \_\_\_\_\_, write the following:

 Indicator-substance that identifies chemical conditions or changes

 **Foldable Guide**

 **D**efinition

 **T**ype of Indicator (physical, chemical, or biological)

 **L**evels

 **C**auses of change

 **R**esults

 **I**mprovements

 **E**xtra notes/**E**xamples

\*On the **“Temperature”** flap of your foldable, write the following:

**D** Temperature- the measure of average kinetic energy or amount of heat

**T** Physical indicator

**L** Between 0oC and 21oC ( 32oF and 81oF)

**C** Source of water, time of year, sediment, depth, amount of shade

**R** Easier to catch disease, death

**I** Cooling towers, more shade

**E** Cold water holds more oxygen than warm water. Thermal pollution (warm water dumped into rivers from nuclear plants) decreases oxygen levels).

\*On the **“Dissolved Oxygen”** flap of your foldable, write the following:

**D** The amount of dissolved oxygen in the water

**T** Physical indicator

**L**  Avg 9.0ppm, needs to be 4-5ppm to support fish

**C** Wave action, wind, depth and plant growth, temperature of water

**R** Too low🡪can cause stress or death for organisms, high DO better taste, pipe corrosion

**I** Control nutrient content, algae growth and water movement

**E** Pollutants like sewage, fertilizers, and animal waste can decrease oxygen levels.

\*On the **“pH”** flap of your foldable, write the following:

**D** Measures acidity of the water 0🡪7acid, 7 is neutral, 7🡪14 base

**T** Physical indicator

**L**  Fresh water 6.0🡪9.0, Swamp as low as 4.3, Salt water 8.1 or as low as 7.7

**C** Natural conditions (swamps), dumping of wastes (batteries), farm runoff (lime)

**R** Most aquatic life has limits that result in death if exceeded

**I** Control pollution

\*On the **“Turbidity”** flap of your foldable, write the following:

**D** A measure of the concentration of particles suspended in water (how clear the water is)

**T** Physical indicator

**L** Ideal: 1 NTU, high 5 NTU (Nephelometric Turbidity Unit)

**C** Runoff, algae growth, waste discharge, phytoplankton, increase in erosion and bottom being “stirred up”

**R** High level increase sunlight absorption causing temperature increase in water which can cause death for organisms due to the reducing of dissolved oxygen

**I** Control sediment, reduce nutrients to reduce algae, limit boat speed

**E** Suspended particles also scatter light, decreasing phosythnesis activity in plants and algae, which can also contribute to lower oxygen levels

\*On the **“Salinity”** flap of your foldable, write the following:

**D** Measure of the amount of dissolved salts in the water

**T** Physical indicator

**L** Depends on type of water

**C** Amount or rain, stream levels, evaporation

**R** The wrong amount can cause death (don’t want salt in a fresh water environment)

**I** Water conservation

\*On the **“Nitrates and Phosphate”** flap of your foldable, write the following:

**D** Measure of the amount of nitrates or phosphates in the water

**T** Chemical indicator

**L** Drinking water nitrates max 10 mg/L, higher than 90 mg/L nitrates will effect fish, .65ppm (phosphates) or .08ppm for (nitrates)

**C** Fertilizer runoff, detergents, sewage, animal waste will cause an increase

**R** Increase plant production and fish population causing overcrowding, dissolved oxygen levels decrease killing organisms when levels of nitrates and phosphate go up, can kill children

**I** Improve water treatment and restrictions or bans on products or processes, increase buffer zones

**E** Nitrates can come from animal waste and fertilizers that seep into the soil. Some amounts are normal in water, but elevated levels are harmful.

\*On the **“Bio-Indicators”** flap of your foldable, write the following:

**D** Aquatic plants and animals used as indicators of water quality, due to their sensitivity to pollution

**T** Biological indicator

**L**  Too many or too few organisms could indicate unhealthy water

**C** Excess nutrients, pollution resulting in change in temp, pH, DO, nitrate and phosphate levels

**R** Too many or too few organisms are present

**I** Control pollution, remove waste, treat water

**E** Fish used most often. Other organisms used are aquatic plants, aquatic insects, leeches, mussels, and worms.

\*On page \_\_\_\_ of your interactive notebook, write the following:

**Ways to monitor water quality in North Carolina:**

1. Network of wells drilled to measure groundwater levels
2. Water quality monitoring stations
3. Satellite photos
4. Programs to monitor effects of agriculture on water quality