PEER Life Science Water’s the Matter Measuring Temperature Notes Outline

**Introduction**

* Water temperature can help determine which organism can survive in a given watershed or aquatic habitat.

**Lesson**

* Temperature is a physical property that affects the suitability of water for a particular use.
* Temperature is a measurement of the average thermal energy of a substance.
* Temperature is an abiotic (non-living) factor that affects organisms in the environment.
* All organisms have temperature preferences or a range of tolerance, which is a set of environmental conditions within which an organism can best survive and reproduce.
* Fish, like bass and trout, depend on water for both their habitat and for their food. Bass require warm/cold rivers while trout require warm/cold streams or lakes.
* Some organisms, known as thermophiles, can survive temperatures that reach the boiling point.
* Water temperature affects the amount of oxygen that can be dissolved, the temperature of organisms within the water, the rate of photosynthesis by plants in the water, and the health of organisms in the water.
* Temperature can be measured with either a simple or digital thermometer and is usually expressed in degrees of Fahrenheit or Celsius.
* The equation to convert Fahrenheit to Celsius is $F= \frac{9}{5}C+32$
* Water temperature and dissolved oxygen are inversely related to each other, which means that as temperature increases, the amount of dissolved oxygen increases/decreases.
* If the temperature of water increases, the dissolved oxygen level will increase/decrease, which will cause some organisms to no longer be able to survive.
* Animals, like fish and amphibians, will have the same temperature within their body as the temperature of the water surrounding them. These types of organisms are commonly called “cold-blooded”, but are scientifically called poikilothermic or ectothermic.
* As water temperature rises, the metabolism and activity of aquatic life also rises. This rate drops above at temperatures over about 100 °F.
* As a general rule, fish that live in colder water tend to be smaller/larger.
* For aquatic plants, generally as the water temperatures increase, the plants tend to produce more/less oxygen, grow faster/slower, and die at a faster/slower.
* Fish and other organisms that are exposed to altered environmental conditions are referred to as being stressed and may not be as healthy or live as long.
* The temperature of a body of water can change due to air temperature, sunlight, turbidity or the amount of solids suspended in water, and thermal pollution.
* Sunlight, or solar radiation, is a form of thermal energy that can be transferred to the water’s surface as heat to increase the temperature of the water.
* Turbidity is the measure of the relative clarity of a liquid and a measurement of the amount of suspended solids in a water. The suspended particles will absorb head from solar radiation more efficiently and increase/decrease the temperature of the water.
* Thermal pollution is the degradation of water quality by any process that changes the ambient or natural water temperature.
* Water can also be warmed when a river is dammed because dams slow the current of rivers and allow the water to be exposed to the sun more/less than if it were free flowing.
* Wetlands are direct connections between rivers and cooler groundwater. They can serve to dilute toxic chemicals and increase/decrease the amount of dissolved oxygen in the water supply by filtering out bacteria.