ABIOTIC FACTORS WHICH AFFECT WATERSHEDS

One of the abiotic (non-living) factors that is important to the structure and function of watersheds is water velocity. Velocity is distance per time and is usually measured in meters per second (m/s).

When scientists measure water velocity, they cannot measure it directly. Instead, they measure a distance on a stream and determine the amount of time that it takes an object to travel (float) that distance. Scientists can then calculate the water velocity by dividing the distance by the time. In a watershed, some of the factors that could affect water velocity are large amounts of rain in a short period of time or melting snow.

Another abiotic factor that affect watersheds is discharge. The discharge of a stream or river is the amount (volume) of water that passes a point in a certain amount of time. For example, the discharge of a stream might be 5 cubic meters per second (5 m3/c) or 5,000 liters per second (5,000 L/s).

Moving water causes the erosion of soil and rocks. The loose particles of soil, rock, sand, and other substances are called sediment. Sediment is often suspended in the water and can travel with the water. Sediment eventually settles to the bottom of a water body. This process is called sedimentation.

When studying sediment and sedimentation, scientists also study the turbidity of water. Turbidity is one measure of water quality. Turbidity is often described as how clear or cloudy water appears. The more turbid the water, the less light that can pass through it. Water velocity can affect sedimentation and turbidity in a watershed.

Other abiotic factors that have an impact on watershed include temperature and dissolved oxygen.

The temperature of water can change greatly in a watershed over the course of a year depending on the seasons. Water temperature affects the types of organisms that can live and reproduce in areas of the watershed. For example, fish that need cooler water temperatures may migrate upstream to cooler waters in summer months.

Organisms that live in water require oxygen to survive, just like land organisms do. Oxygen gas in water is called dissolved oxygen . The amount of dissolved oxygen in water determines what kind of fish and other organisms live in the water. In estuaries like the Chesapeake Bay, the amount of dissolved oxygen in the water varies with the seasons.

All water in a watershed eventually leads to the ocean. The area where this occurs is called an estuary. In estuaries, the salt water of the ocean mixes with freshwater from streams and rivers. This brings about changes in salinity. Salinity is the amount of dissolved salts in water. Most of the salt in ocean water is sodium chloride, the same salt that is used for table salt. Salinity affects the ability of organisms to live in the water. Some organisms can tolerate higher salinity, but others cannot.

The amount of dissolved oxygen in water increases with the faster water moves. Fast moving water, especially fast moving water flowing over rocks and waterfalls, allows more water surface area to come into contact with air, so more oxygen can be “captured” by the water. Fast moving water mixes the oxygen with the water more efficiently.

Although water velocity plays an important role in the dissolved oxygen content of streams, the ability of water to “hold on” to dissolved oxygen is also dependent on temperature. Warm water dissolves less oxygen than cold water.

Name:_____

Science/ Key/ Block#___ Date:_____

Abiotic (non-living) versus Biotic (living) Factors

At Home - *look around at home & think of examples*	
Abiotic Factors	Biotic Factors

In a Forest - *think about a forest & some examples from front might apply*	
Abiotic Factors	Biotic Factors

In a River - Use the other side of this page to place abiotic and biotic factors into the chart below.	
Abiotic Factors	Biotic Factors
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.

Summarize the reading on the front in a paragraph. Be sure your paragraph has <u>at least</u> five sentences, has in introduction and conclusion, with three supporting details. Use extra paper if you need it.

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