“HANDS ON” CREEK STUDY AND EVALUATION

Some ways to evaluate the health of a stream:

1) **First, walk along the banks and use your eyes and journal to record: What time of year is it? (winter, spring, summer, fall) Is there water? Is it stagnant or is it running? Is anything growing on it? Is there vegetation growing along the banks? Can you see any living organisms in the water? What sort of bottom is there? (rocks, gravel, dirt, silt, vegetation)**

2) **If you can safely scoop up some water into a small bucket, do it, but without hitting the bottom of the stream.** Scoop some water into your turbidity tubes. How clear is the water? Dip your pH strip into the tube. Record the pH. **(pH -** An increasing pH level is dangerous to the ecosystem of the water body. A safe pH range for a pond or a lake is between 6.0 to 8.0; however, certain factors such as overgrowth of algae and pollution alter the pH of the water and increase the levels of toxic ammonia.)

3) **Record temperature -** Temperature is a crucial factor that affects the other water quality parameters such as, the rate of photosynthesis and metabolism, the dissolved gas concentrations, the conductivity and salinity, the pH, and the water density amongst other factors.

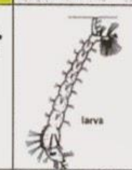
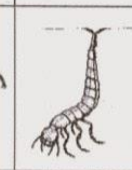
4) **Dissolved Oxygen Levels -** The dissolved oxygen (DO) is a measure of the amount of oxygen available to the flora and fauna and is reported as percent saturation or mg/L. The oxygen levels in water go down owing to the decomposition of organic material such as dead plants and animals and human wastes. A dissolved oxygen level of less than 6 mg/L can be harmful to the ecosystem of water bodies.

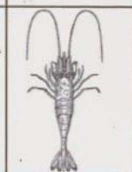
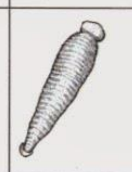
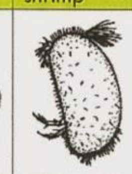
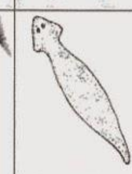
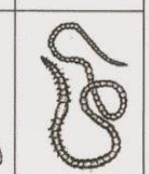
5) **Turn over a rock or two and using a small net, collect or examine and note any bugs living under them. (sorry bugs).** Use the macro-invertebrate chart to see if they are listed on it.

   RESOURCES: bugchart.pdf (mostreamteam.org)

"HANDS ON" CREEK STUDY AND EVALUATION

Identify and count the macroinvertebrates in the sample and record results in the table below. Using the cards provided, determine the diet for each of them.

Name	Riffle beetle	Riffle beetle larva	Mayfly nymph	Caddisfly larva	Water mite	Damselfly nymph	Dragonfly nymph	Water flea	Mosquito larva	Diving beetle	Diving beetle larva	Screech beetle larva
Animal												
Number of organisms												
Tolerance	Very sensitive			Sensitive					Tolerant			
***Diet**												

Name	Water strider	Back-swimmer	Shrimp	Snail	Amphipod	Leech	Water boatman	Cyclops	Seed shrimp	Soldier fly larva	Flatworm	Worm
Animal												
Number of organisms												
Tolerance	Tolerant										Very Tolerant	
***Diet**												

*Key: C = carnivore H = herbivore O = omnivore D = detritivore P = parasite = zooplankton

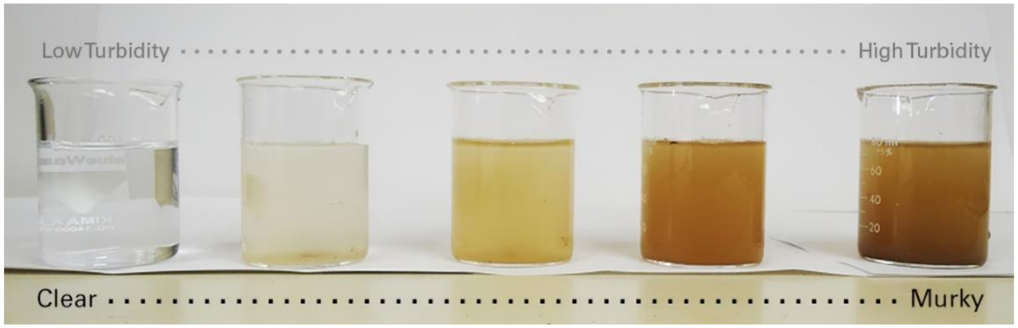
"HANDS ON" CREEK STUDY AND EVALUATION

STREAM TURBIDITY – What is Turbidity?
Turbidity, or cloudiness, in water is caused by a variety of suspended materials. The material can be both organic (plankton, sewage) and inorganic (silt, clay). The suspended material will scatter and absorb light passing through the water. The light scattered back to the observer can be affected so that the water will have a color dependent upon the type and amount of suspended matter. The cloudiness and color can be observed also if a sample of water in a transparent container is held between the observer's eye and a light source.

Instructions for use of a Turbidity Tube
One way to study water clarity is to use a turbidity tube. Water is poured from a bucket into the turbidity tube until the image at the bottom of the tube is no longer visible when looking directly through the water column. The observer rotates the turbidity tube while looking down at the image to see if the black and white areas of the decal are distinguishable. This depth of water is recorded to the nearest 1 cm. Data is entered for each observer, note the average of the different observations. If the image on the bottom of the tube can been seen even after filling it, the depth is recorded as greater than (>) the depth of the tube. Ideally a clear tube is best.
To make a turbidity tube:

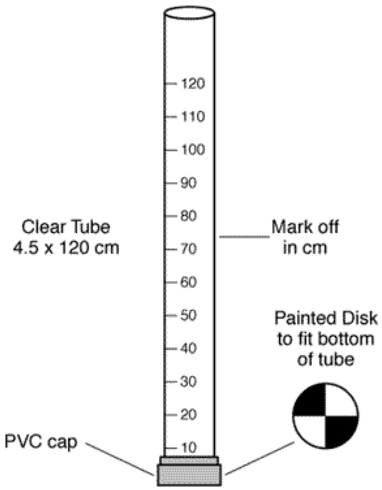
1. Put a PVC cap over one end of 3-4-foot clear tube such as a fluorescent light protector. The cap should fit tightly so water cannot leak out.
2. Cut a disk from wood, plastic, or cardboard the same size as the tube diameter.
3. Divide the disk into fourths. Paint alternating quadrants black and white. Seal the disk by laminating or painting with varnish to make it waterproof.
4. Glue the disk in the bottom of the tube, painted side facing up (toward the open end of the tube).
5. Use a marker and meter stick to make a scale on the side of the tube, beginning with 0 cm at the top of the disk.

Source: Global Learning and Observations to Benefit the Environment (GLOBE)



“HANDS ON” CREEK STUDY AND EVALUATION

Figure 10
Turbidity Tube



High turbidity will decrease the amount of sunlight able to penetrate the water, thereby decreasing the photosynthetic rate. Reduced clarity also makes the water less aesthetically pleasing. While this may not be harmful directly, it is certainly undesirable for many water uses.

When the water is cloudy, sunlight will warm it more efficiently. This occurs because the suspended particles in the water absorb the sunlight, warming the surrounding water. This can lead to other problems associated with increased temperature levels.

While highly turbid water can be detrimental to an aquatic ecosystem, it is not correct to assume that clear water is always healthy. Slightly turbid water can be perfectly healthy, while clear water could contain unseen toxins or unhealthy levels of nutrients.

Key Components A turbidity tube is made up of four key components (see Figure 2): 1. A Clear Tube 2. A Tube Cap 3. A Viewing Disc 4. A Measuring Device (1) Clear Tube: The clear tube will hold the water sample being tested. The tube must be clear to allow for maximum light reflectance off of the marker being viewed. Even a light colored or white plastic tube will not let in enough light for the tube to work properly. A clear plastic tube will provide the most durability and reduce the chances of damage during transport, but a glass tube can be used if handled with caution. Possible Clear Tube Materials: Fluorescent light sleeve, graduated cylinder, etc. (2) Tube Cap: The tube cap prevents the water sample from leaving the clear tube. A seal to the end of the tube can be used, but a removable tube cap is preferred for cleaning of the tube and view disk. Make sure that whatever cap is used prevents leakage (a good seal is more important than removability). The size of your cap will depend on the size of your tube. Possible Tube Caps: Rubber stopper, PVC pipe cap, Gatorade lid with rubber washer, chair leg end cap, etc.

Source: http://serresconseil.com/WASH/Watsanmissionassistant/mainSpace/files/Turbidity-Myre_Shaw.pdf