Name _____ Date _____

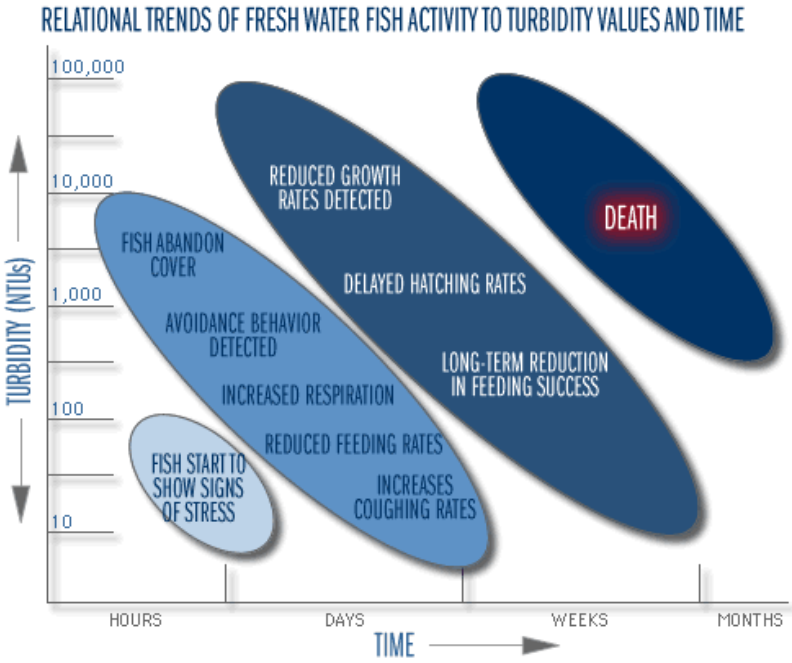
Is it too cloudy?

Background: Now that you know a bit more about turbidity, you are going to design a study to test whether the streams in your area are affected by turbidity.

Before you begin: List the kinds of things that you think may impact the level of turbidity in the water:

Students may talk about erosion, weather, construction, plankton growth, currents, tides, wind, etc.

Use this chart to help you evaluate whether you have high or low levels of turbidity in your stream. Notice that the only time animals are not under stress is if turbidity levels are below 10 NTUs, according to this diagram. However, turbidity levels in a river like the Hudson can fluctuate between 20-100 NTUs on a daily basis. During large storms, such as a hurricane, the turbidity may rise to 1,000 NTUs or higher.



Source: www.lakeaccess.org/russ/turbidity.htm

Materials:

- Sample bottles
- Tape & marker to label your bottles
- Gloves
- Turbidity meter

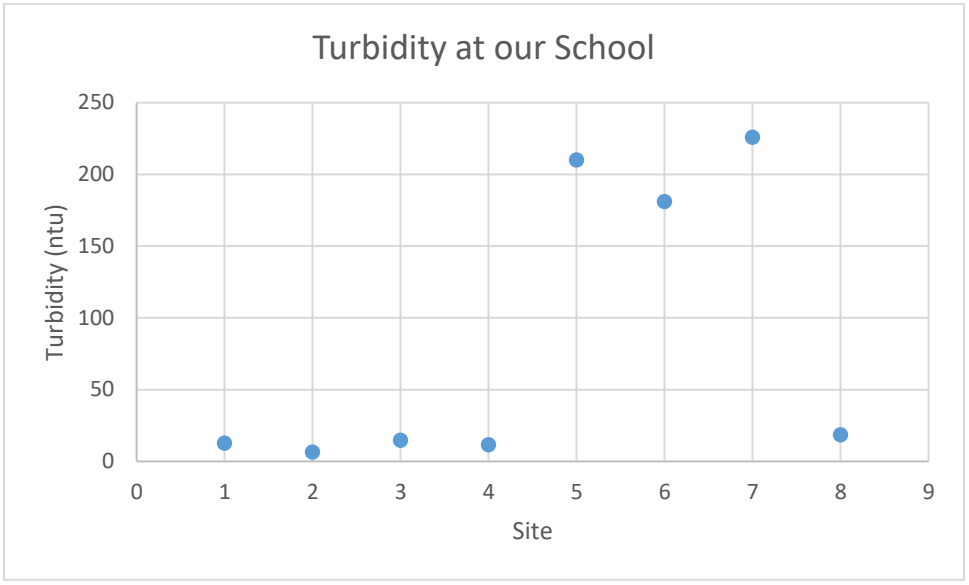
Procedure:

1. Identify a sampling site with your teacher. Draw a map of your sample site on a blank sheet of paper. With your class, decide where you will take your samples before you go outside.
2. While outdoors, follow appropriate safety procedures.
3. Mark the location of each sample site on your map, and write down the bottle number at that point. Take replicates of your samples.
4. When you return to the classroom, measure the turbidity levels of your samples. You may need to revise this chart depending on the type of data you are collecting. *These are sample data.*

Site	Turbidity	Average
1A	12.4	
1B	12.8	12.6
2A	6.2	
2B	6.5	6.35
3A	14.8	
3B	14.7	14.75
4A	11	
4B	11.9	11.45
5A	209	
5B	211	210
6A	180.6	
6B	181.4	181
7A	225.2	
7B	226.6	225.9
8A	18	
8B	18.9	18.45
Average	85.1	

Discussion Questions

1. Create a graph of your data. *These are sample data.*



2. You calculated an average for your class. How do all of your data compare with this average (this is called *variability)*? In other words, are your data close to the average or do they vary greatly from one another? Why or why not?
   Answers will vary based on your data. For these data, students should notice that the average does not describe the data set very well, because there are some very low values and some very high values. Therefore, there is a lot of variability in this data set. We should interpret these data based on the location the samples were taken – what was happening at sites 5, 6, and 7 to make the turbidity so much higher than the other sites? Are these different locations on the same stream, or different streams, different times of day or year, etc? Describing your data should include interpretation of the data but also incorporate what you know about your site.

3. If you wanted to repeat this experiment, explain what you would do to improve your confidence in the results.
   Students should make predictions based on location, time of year, etc, and sample their location(s) multiple times and in multiple places.

4. Using the graphic on the first page, are the turbidity levels in your area a problem?
   The higher turbidity values are a problem and could impact aquatic life.

5. Think back to the turbidity data for the seven streams in the areas with hydrofracking. How do your data compare with those data? Explain.

   Our data have a wide range, but some of the values are similar to what was found in the hydrofracking investigation.

6. The local town council needs to decide whether to allow a large construction project to go forward, which would increase turbidity due to erosion from the building site. Think about the sources of data that you have - could you make a recommendation about whether to approve the building permit? Why or why not?

   We do not currently have enough information. We would need to know exactly where the building is going to be placed, how far away the stream is, what kind of safeguards they are doing to put into place to reduce erosion, etc.