**Name**: Planning for the Construction of a Treatment Project  
  
**Content** **area**: Chemistry, Environmental Science  
  
**Grade**: 8-12  
  
**Standards**:

1.6.8-11. ACEF

3.1.7. E

3.1.10. A

3.2.7.B

3.2.12.D

3.6.12.C

4.3.7-10. AB

4.8.12.AB

**Overview:**

Understanding the dynamics of planning for a treatment system is just as important as creating one. It is a complex process that ensures the proper treatment system is designed and implemented for the given area. There are many factors that go into this process. This lesson explores one environmental consulting company, NMBS Environmental, and some requirements for companies seeking consultation for treatment projects.   
  
**Resources**:

* <http://nmbsenvironmental.com/treatment.html>

**Materials**:

* Computer/Internet access

**Objectives**:

* TSWBT navigate through the website provided in order to answer all questions on the worksheet.

**Set** **Up**:

1. Provide students with the link above.
2. Give students their worksheet to take home for homework.

**Introduction**:

1. You may want to pull the site up in front of students so that they can get a visual.
2. Highlight the tabs on the side which correspond to different information.
3. They will be able to answer all questions from information found within those tabs and this website.

**Procedure:**

1. Students should use the website in order to answer all questions on the worksheet.

**Closure:**

1. Have students hand in the worksheet to be graded before or after reviewing the answers.

**Adaptations/Extensions:**

1. If you do not wish to have this as a homework assignment, or if many students do not have access to internet outside of school, this could easily be done as an activity in the classroom.

Directions:  
 You are looking to create a treatment system for an area effected by abandoned mine drainage. There are several organizations who grant permits in order to complete projects such as treatment systems. NMBS Environmental is one of those companies located in Mansfield, Pennsylvania. Navigate through their site in order to answer the questions below so that you can determine what steps you need to take in order to fulfill the requirements to obtain your permit.

* 1. What are some of the factors that would influence the design of a treatment system?
  2. Restoration plans include a conceptual design. Describe what a conceptual design is. What do you think is the purpose of a conceptual design?
  3. What should be included in a restoration plan?
  4. There is a link which provides an example of a restoration plan. For which watershed was this plan created. Note some observations you make.
  5. List **two** of the completed project assessments listed on the site.   
     *Example: Loop Run Watershed*
  6. Choose **one** of the projects that you wrote down for question 5, and write down two things that were done to assess that watershed.   
     *Example:   
     1. A stream walk was conducted along the entire course of Loop Run and fifteen sampling locations were established.   
     2. Fifteen sites were sampled monthly for one year for chemical parameters and flow rates.*