Activity name: It's the Pits

This activity is designed for students who have the prerequisite skills that can be applied to a real-life problem involving impurities in water.

This activity is meant to provide a real-world application of the ATEEC Recommended Core Curriculum's math, science, technical, communications, or critical thinking knowledge and skill concepts, which have been identified by the ATEEC Fellows as necessary preparation for environmental technology occupations.

Appropriate for which course(s)?): High school and college Lab Sciences.

Concept/skill learned (i.e. from K/S Tables): : Interpret and evaluate laboratory analysis results, demonstrate problem solving.

Approximate time to complete activity: 1 class meeting

Source of idea or activity (for published source, please include author, title, publisher, date): Rick Wells; Science Educator; Central High School; Davenport, IA

Materials/resources needed (equipment, print media, electronic media, videos, supplies, etc.):

Common laboratory equipment, Assorted glassware, Reagents, which are listed under Ion Test in the Activity Worksheet.

*SCANS skills addressed:*Solve problems, manage self, acquire and evaluate information, participate as a member of team, apply technology to a task.

Learning objectives - Students will be able to:

Students apply their knowledge of laboratory procedures, scientific principles, and problem solving skills in this activity. They are given a water sample that contains various contaminants. Given several possibilities, they determine what contaminants are present, develop a procedure for cleaning the water, perform the cleaning procedure, and evaluate their performance. During the activity, students should be able to:

- Demonstrate appropriate and safe laboratory procedures.
- Determine which impurities are present.
- Develop an adequate method for cleanup.
- Provide a lab report upon completion of the activity.

Description of Activity:

Instruction: For this laboratory activity:

1. Instructor or lab assistant prepares a water sample that contains several of the compounds listed below. Choose which ones you wish to use, however you will have the students test for the presence of five different impurities (Fe, Ca, Cl, SO4, Pb).
2. The students draw off small samples into five separate test tubes. A few drops of a reagent are added to each tube, and a color change shows the presence of a particular impurity.
3. Once the students determine what is present, they need to determine a method they can follow to remove the impurities, complete the cleanup activity, and then re-test the water to determine if they have been successful. (Distillation will provide the desired results.)

Activity submitted by: Dennis Robeson

CONTINUES ON NEXT PAGE

Activity Worksheet:

Scenario:

Cherie is a high school age student who resides in Anyplace. Cherie is a wonderful girl and was helping her mother clean the basement when she uncovered an old sump pit. The pit was half full of water, and had a gray film on top. Being an inquisitive science student, Cherie immediately began to wonder how safe the water was. She took a sample to her high school chemistry teacher, Ms. McClean, who agreed to help her test it. Ms. McClean completed an initial screening and showed Cherie what tests she could perform on her own to determine the types of impurities.

Questions:

1. What ions are in the polluted water?
2. What are your procedures for cleaning the water. Draw and discuss.
3. Were you successful? Does your clean water still contain the impurities? The ions?

Ion Test

Reference Ion for ( ) Test	
(Fe) use: $Fe(NO_3)_3$	use: KSCN
(Ca) use: $CaCl_2$	use: $Na_2C_2O_4$
(Cl) use: $CaCl_2$	use: $AgNO_3$
(SO_4) use: $FeSO_4$	use: $BaCl_2$

An appropriate color change will indicate presence of the ion. This blank page may be used for notes.

Return to http:/www.ateec.org/ > Learning Resources > Instructor > Environmental Tech Activities