Lesson Plans are provided to help organize an existing curriculum, allowing the teacher to spend more time on hands-on activities that meet key classroom learning objectives and improve student achievement. The Lesson Plans will aid the teacher in integrating LaMotte test kits and equipment into classroom activities that meet National Science Education Standards.
Concept/Topic
Introduction and demonstration of water treatment methods and simple water test procedures.

Time Requirement
one class/lab period

Subject Area(s)
Chemistry, Environmental Science, Mathematics

General Goals
1. The students will gain a basic understanding of the importance of having “clean” water and some of the processes used to produce it.

Specific Objectives
1. Students will be able to explain the need for water treatment.
2. Students will be able to list types of water treatment and the conditions when they are used.
3. Students will be able to follow instructions and work together as a team.
4. Students will be able to make observations.
5. Students will be able to collect and analyze data, and draw a conclusion.

Materials, Required

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5962</td>
<td>Classroom Studies, Water Treatment Lab</td>
</tr>
<tr>
<td>2-2146</td>
<td>Safety Goggles</td>
</tr>
<tr>
<td>2-2234</td>
<td>Gloves</td>
</tr>
<tr>
<td></td>
<td>Timer/clock</td>
</tr>
</tbody>
</table>
**Materials, Optional**

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>3608</td>
<td>Tapwater Tour</td>
</tr>
<tr>
<td>5914</td>
<td>Funky Faucet Sink Science Kit</td>
</tr>
</tbody>
</table>

**Anticipatory Set (Lead-In)**

Drinking water comes from many sources. Fortunately, water of widely varying qualities may be treated to make satisfactory drinking water. Cities and towns need large quantities of drinking water. Most cities and towns have a central water system where the water is stored. Before any water can be distributed to the homes, it has to be treated to make it safe to drink. The water may be chemically treated, filtered and chlorinated at a water treatment plant.

Water for cities and communities is usually sanitized. Chlorine is most commonly used because it is effective against a wide range of microorganisms. If chlorine is present in the water for a few minutes, disease-producing bacteria will be destroyed.

Some waters must be treated to remove odors and color. Activated carbon is often used to absorb odor-producing waste and color and remove them from the water.

Settling and filtration remove unwanted turbidity.

**Preparation**

Read the manual to become familiar with the text and test procedures. Review instructions for use of the Demineralizer Bottle and folding filter paper. Replace the cap on the Charcoal Suspension. Cut foil strips of tablets as directed. Prepare and package a set of items for each of the 5 teams. Decide how to divide the students into 5 teams. Make a copy of the Student Procedures for each team.
Step-By-Step Procedures

1. Divide students into 5 groups.
2. Present the Introduction and Clean Water lecture material.
3. Pass out a set of bagged items to each team.
4. Have members of each team decide on duties of each member. For example, instruction reader, reagent adder, mixer, time keeper, result recorder etc.
5. Read instructions aloud, one step at time, as students perform the Testing for Chlorine procedure.
6. Present Odor lecture material.
7. Read instructions aloud, one step at time, as students perform the Removing Odor procedure.
8. Present Color and Turbidity lecture material.
9. Read instructions aloud, one step at time, as students perform the Removing Color and Turbidity procedure.
10. Discuss students' results.

Plan for Independent Practice

Have students review additional information on water treatment on websites included in the Resources section. Have students read and become familiar with Student Procedures.

Closure (Reflect Anticipatory Set)

As the population increases, the demand for good water will increase. Although water has not become scarce, it is becoming polluted. Polluted water is not useless since it can be treated to make it safe to drink or to be used for purposes other than drinking. Sometimes, clean water is needed more quickly than the natural purification processes can handle. Water can undergo man-made treatment to remove or destroy unsafe substances.
Assessment Based on Objectives
Have students:
- explain the need for water treatment.
- list the water treatment procedures that they used during the demonstration.
- describe the steps of the water treatment procedures.

Adaptations (For Students With Learning Disabilities)
- Provide written and verbal instructions for test procedures.
- Provide a copy of lecture material.
- Give students a copy of the Student Procedures ahead of time so they may become familiar with the instructions.

Extensions (For Gifted Students)
- Have students follow suggestions in the manual for Additional Experiments.
- Plan a tour of the local water treatment plant.
- Have students use terms in the Glossary to create a water treatment crossword puzzle.

Possible Connections To Other Subjects
- Social studies - land use and urbanization

Resources

**Literature**
- EPA Drinking Water for Kids
  - [www.epa.gov/OGWDW/kids](http://www.epa.gov/OGWDW/kids)
  - Information and games about water treatment

**Methods**
- Standard Methods for the Examination of Water and Waste Water
  - [www.standardmethods.org](http://www.standardmethods.org)
  - Details of test methodology

**Equipment**
- LaMotte Company
  - [www.lamotte.com](http://www.lamotte.com)
  - Review and order additional equipment

**EPA Water Treatment Cycle**
- [www.epa.gov/OGWDW/kids/treat](http://www.epa.gov/OGWDW/kids/treat)
  - Games, activities and other stuff
National Science Content Standards Addressed

A  Science as Inquiry
All students should develop:
  • Abilities necessary to do scientific inquiry
  • Understanding about scientific inquiry

B  Physical Science
All students should develop understanding of:
  • Properties and changes in matter

D  Earth and Space Science
All students should develop understanding of:
  • Structure of the Earth system

E  Science and Technology
All students should develop:
  • Abilities of technological design

F  Science in Personal and Social Perspectives
All students should develop understanding of:
  • Personal health
  • Populations, resources, and environments

Resources