Lab: Acid & Base

FOR THE TEACHER

Summary
In this lab, students are given four unknown liquids and must identify whether they are acids or bases. They will write a scientific paper to prove their findings.

Resource Type Lab
Grade Level Middle school

Objectives
By the end of this lesson, students will
- Be able to identify whether a liquid is an acid or base using litmus paper.
- Be comfortable using terms related to acids and bases.

Chemistry Topics
This lesson supports students’ understanding of
- Acids and bases
- pH
- Indicators

Time
Teacher Preparation: 40 minutes
Lesson: 45 minutes

Materials
For each group:
- four unknown solutions with different pH values
- litmus paper

Safety
- Safety goggles should always be worn when working in a lab.
- When working with acids, if any solution gets on students’ skin, they should immediately alert you and thoroughly flush their skin with water.
- Students should wash their hands thoroughly before leaving the lab.
- When students complete the lab, instruct them how to clean up their materials and dispose of any chemicals.

Teacher Notes
- Grading rubric for final paper

<table>
<thead>
<tr>
<th>Structure of paper</th>
<th>Vocabulary and data</th>
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<tbody>
<tr>
<td>5 orders is easy to follow, has a beginning and conclusion</td>
<td>uses all vocabulary correctly and all data is correct</td>
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<tr>
<td>4</td>
<td></td>
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<tr>
<td>3 introduction and conclusion are there, but neither satisfies reader</td>
<td>missing some vocabulary words or data is inaccurate</td>
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<tr>
<td></td>
<td>lacks a sense of direction; no introduction or conclusion</td>
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- Suggestions for the unknowns: odorless liquids without recognizable color and pH values are different. You could use very dilute hydrochloric acid, liquid soap, very dilute sodium hydroxide or ammonia hydroxide, baking soda solution, citric acid or vinegar (few students recognize its smell). Don’t use liquids that have pH close to 7 unless students have access to pH sensors.
- This activity pulls in ELA of Common Core because of the writing assignment.

**FOR THE STUDENT**

**Student Activity Sheet: Acids & Bases**

**Lesson**

**Background**

You are a scientist in a lab, and you need to determine whether four liquids are either an acid or a base. You will present your findings in a scientific paper to prove to your supervisor that you know what you are talking about and deserve to be paid. This paper must include a title, an introduction paragraph, a data table, and a conclusion (explain your results). That means four different sections.

Each paragraph should include at least four sentences. This paper should make sense to someone that knows nothing about acids or bases.

Vocabulary words that should be used and underlined include **acid, base, pH, compound, electrolyte, litmus paper, liquid, and indicator.**