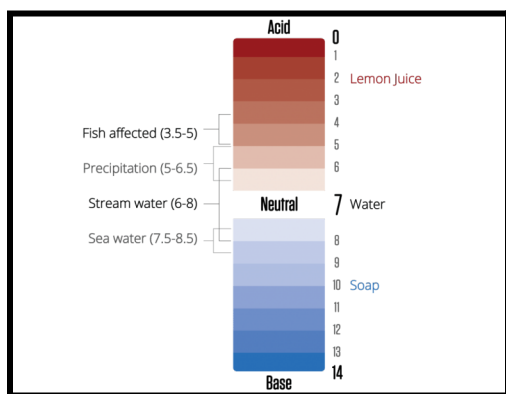
	Comparing pH of household items	<b>Date</b>	xx/xx/20xx
<b>Grade/level</b>	4-8	<b>Length</b>	55-60 minutes
<b>Brief Description</b>			
<p>Students will test the pH of the control, then add an acidic substance, testing the pH again. Then they will add a basic substance to a new sample. All results will be recorded either on Water Rangers notepaper or printed handouts/scrap.</p> <p>After the lab is carried out, students will be provided with a handout of questions intended to foster further inquiry. Students can brainstorm and answer these in groups, or with the instructor.</p>			
<b>Guiding Question(s)</b>			
What is pH? How do certain household products change the pH of water?			
<b>Curriculum Connections</b>			
This lesson applies generally to all of our curriculum mapping. For more information, see <a href="https://waterrangers.ca/curriculum-mapping/">https://waterrangers.ca/curriculum-mapping/</a>			
<b>Learning Goals:</b>		<b>Success Criteria</b>	
<p>Today I will:</p> <ul style="list-style-type: none"> <li>- Learn about what pH is</li> <li>- Test the pH of water</li> <li>- Change the makeup of my water using different items</li> <li>- test for changes in pH</li> <li>- Record my result</li> </ul>		<p>I can:</p> <ul style="list-style-type: none"> <li>- Understand what pH is, and what acidic and basic mean</li> <li>- Demonstrate how irregular pH can be harmful to life in waterways</li> <li>- Perform a lab experiment and record my results</li> </ul>	

<p>Why?</p> <ul style="list-style-type: none"> <li>- pH is an important part of water health</li> <li>- pH changes can affect life in and out of the water</li> <li>- pH changes naturally but also in response to pollutants, we need to understand when and why.</li> </ul>	
<p><b>Learning Skills and Work Habits</b></p>	<p><b>Learning Environment</b></p>
<p>Responsibility Organization Independent Work Collaboration Initiative Self-Regulation</p>	<p><b>Indoors:</b> Classroom or activity centre Science lab <b>Outdoors:</b> Activity area, picnic table, dock, etc</p>
<p><b>Resources and Materials</b></p>	<p><b>Technology Integration</b></p>
<p>Water Rangers teststrips Pen/Pencil notepad or scrap paper Containers for samples Lemon juice OR vinegar Baking soda OR dish soap</p>	<p>Use of videos Use of visual aids Option to write lab results digitally</p>
<p><b>Considering any exceptionalities</b></p>	
<p>Provide written summary of lesson to supplement instruction, in either note or digital form. Any colour test will cause trouble for the rare students with selective colour blindness - the pH parameter will be difficult for red-green colourblind students to see. Perhaps provide a chart: (from <a href="https://venngage.com/blog/color-blind-friendly-palette/">https://venngage.com/blog/color-blind-friendly-palette/</a>)</p>	
<p style="text-align: center;"><b>Lesson Breakdown</b></p>	
<p><b>Introduction (10-15 minutes)</b></p>	
<ul style="list-style-type: none"> <li>• Present household items (baking soda, soap, vinegar, orange juice etc) and ask students what these items do</li> </ul>	

- Explain products that students are unaware of in plain language
- Introduce the idea of acids and bases, apply prior knowledge if this has been discussed before ([https://www.youtube.com/watch?v=V5Mq\\_cL9Bck](https://www.youtube.com/watch?v=V5Mq_cL9Bck) good for intermediate and senior learners)

### Introductory information

- pH stands for “potential for Hydrogen”
- pH is measured on a scale; lower numbers are more "acidic," while higher numbers are more "basic"
- Pollution can change pH levels
- Acid rain and mining run-off can lead to acidic, lower pH water. Low pH can make it difficult for life to exist in waterways.



→ Use this scale that we have designed as a visual aid for your students when explaining what pH values mean.

→ Have students reflect upon the scales on the back of their test strip containers.

→ Further reading here: <https://waterrangers.ca/testkits/tests/ph-in-freshwater/>

### Lesson Body (30-40 minutes)

Starting the lab: Break students into groups, and explain the following steps:

- Take a sample of water and dip a test strip into it. record the results. this will be your *control*.
- Next, take another water sample and add a small amount of one of your household products to it. Test for pH, record the results. What do you notice?
- Repeat this step using each product you have!
- Explain that students are creating acidic or basic **solutions**
- If you need additional aids, use this brief video we made for using teststrips: [https://www.youtube.com/watch?v=FyyonM36rF4&feature=emb\\_logo](https://www.youtube.com/watch?v=FyyonM36rF4&feature=emb_logo)

### The closeout (10-15 minutes)

Questions for further understanding:

- Which solution changed your pH the most?
- Which solutions ended up with a higher/lower reading? What does higher/lower pH mean?
- How might water with a high/low pH affect the plants and animals?