

# HISI - LESSON OUTLINE

Module Title Klamath-Trinity watershed (Chem)

LS Team Hoopa

Grade level: 7-12

Lesson # <b>1(chem intro)</b>	Title: <b>pH Demo/activity</b>	Number of Minutes: <b>47</b>
<p>Mathematical purpose: To be able to make a model of the pH scale using red cabbage as an indicator.</p>		<p>Scientific Purpose: To better understand the pH scale and indicators and how they are used and pH of common household substances) To be able to make a pH scale using red cabbage as an indicator.</p>
<p>Materials needed: Universal indicator, pH indicators, Dry Ice, hydrochloric acid, sodium hydroxide, beakers, glass demonstration tube <a href="#">Rainbow tube instructions</a> <a href="#">Dry ice color show instructions</a></p>		<p>Academic vocabulary:</p>
<p>Common Core Standards (copy and paste): <a href="#">CCSS.Math.Content.HSS.ID.A.1</a> <a href="#">CCSS.Math.Content.HSS.ID.A.2</a> <a href="#">CCSS.Math.Content.HSS.ID.A.3</a> <a href="#">CCSS.Math.Content.HSS.ID.A.4</a> <a href="#">CCSS.Math.Content.HSS.ID.B.5</a> <a href="#">CCSS.Math.Content.HSS.ID.B.6</a> <a href="#">CCSS.Math.Content.HSS.ID.C.7</a> <a href="#">6.SP.B.5</a></p>		<p>Next Generation Science Standards (copy and paste): <a href="#">MS-LS2 Ecosystems: Interactions, Energy, and Dynamics</a> <a href="#">LS2.A: Interdependent Relationships in Ecosystems</a> <a href="#">LS2.B: Cycle of Matter and Energy Transfer in Ecosystems</a> <a href="#">LS2.C: Ecosystem Dynamics, Functioning, and Resilience</a> <a href="#">LS4.D: Biodiversity and Humans</a>  <a href="#">HS-LS2 Ecosystems: Interactions, Energy, and Dynamics</a></p>
<p>When students are finished they will understand: The needs of salmon in the river (temp/O2/clean water/habitat) Who are the Stakeholders involved in 2002 Klamath fish kill Possible reasons for 2002 fish kill Possible solution to prevent another fish kill</p>		<p>What are teacher questions or prompts? How are fish (salmon) important to you What do fish (salmon need to survive) What do you think killed the fish in the Klamath river in 2002 What stakeholder group do you most identify with What are some possible solution to prevent another fish kill</p>
<p>What are questions you anticipate students will have? why were the flows so low in the river who is responsible</p>		<p>What are misconceptions students might have? That the farmers caused the fish kill That Warren Buffet caused the fish kill</p>

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	The effect of illegal water diversion on our rivers
<p>General outline of the lesson:</p> <p>Chemistry portion of the module: water-exploring solutions</p> <ul style="list-style-type: none"><li>I. Sources and properties of water</li><li>II. Water and its contaminates</li><li>III. Solubility, solution concentrations, pH, solubility curves</li><li>IV. Water purification</li></ul> <ul style="list-style-type: none"><li>I. Sources of water (fish kill)<ul style="list-style-type: none"><li>a. Pre-test : studentns will answer a pretest question “what are the needs of salmon in our river in terms or temperature, pH, dissolved oxygen, and turbidity.</li><li>b. Introduce 2002 Klamath river fish kill : <a href="#">Klamath river fish kill earth justice vid</a> (5:43)<ul style="list-style-type: none"><li>i. Brainstorm: students come up with a list of stakeholders involved (farmers, fishermen, tribes,)</li><li>ii. Students will come up with possible reasons and solutions to 2002 fish kill</li></ul></li></ul></li><li>II. Reading – Students will read 2 articles about fish kills and answer questions about the articles<ul style="list-style-type: none"><li>a. <a href="#">Riverwood news: fish kill triggers water emergency</a><ul style="list-style-type: none"><li>i. <a href="#">Reading guide</a></li></ul></li><li>b. <a href="#">Siskiyou daily news: what caused the salmon deaths</a></li></ul></li><li>III. Properties of water Lab pg 5-6 (<a href="#">Chemistry and the community Unit4 Water: exploring solutions</a>)</li></ul>	

Supplemental files/resources will follow

[Chemistry and the community Unit4 Water: exploring solutions](#)

[Klamath river fish kill earth justice vid](#)

[Riverwood news: fish kill triggers water emergency](#)

[Reading guide](#)

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[Siskiyou daily news: what caused the salmon deaths](#)

## Unit 1: water-exploring solutions

1. Sources of water
2. Water and its contaminants
3. Solubility, solution concentrations, pH
4. Water purification
- 5.
- I. Sources uses and properties of water
  - a. Pre-test : students will answer a pretest question “what are the needs of salmon in our river in terms of temperature, pH, dissolved oxygen, and turbidity.
  - b. Introduce 2002 Klamath river fish kill : [Klamath river fish kill earth justice vid](#) (5:43)
    - i. Brainstorm: students come up with a list of stakeholders involved (farmers, fishermen, tribes,)
    - ii. Students will come up with possible reasons and solutions to 2002 fish kill
- II. Reading – Students will read 2 articles about fish kills and answer questions about the articles
  - a. [Riverwood news: fish kill triggers water emergency](#)
    - i. [Reading guide](#)
  - b. [Siskiyou daily news: what caused the salmon deaths](#)
- III. Properties of water Lab pg 5-6 ([Chemistry and the community Unit4 Water: exploring solutions](#))

## III. Water and its contaminants

- a. Read pg 14-17 ([Chemistry and the community Unit4 Water: exploring solutions](#))
  - a. [Reading guide \(physical properties of water\)](#)
- b. Particulate view of water
  - a. [Macroscopic vs particulate view of world PPT \(3 slides\)](#)
  - b. [Modeling matter: pictures in your mind \(students create and evaluate various visual models of matter\)](#)
- c. Temperature, dissolved oxygen and life
  - a. Read pg [27-28](#)
    - i. Complete [reading guide](#)
  - b. Do lab and answer lab questions ([link to Lab](#))

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- d. pH Demo (rainbow tube and colorful carbon dioxide)
  - a. Using universal indicator teacher make a “rainbow tube” that demonstrates the pH scale
    - i. [Rainbow tube instructions](#)
  - b. Using various indicators teacher demonstrated how carbon dioxide (dry Ice) can change the pH of water.
    - i. [Dry ice color show instructions](#)

## IV. Water testing

- a. Read pg [34-35](#)
  - i. Investigation and gathering/ interpreting evidence
- b. Acids and Bases in solution
  - i. Read pg [35-36](#)
    - 1. Developing skills questions 1-4 (pg 36)
- c. Solution concentration and pH
  - i. Read pg [36-38](#)
    - 1. Interpreting the pH scale 1-6 (pg 37)
    - 2. Sources of acid and basic contamination (pg 38)
      - a. Gather information and explore questions 1-4 (pg 38)
  - ii. Lab (gathering evidence) Titration of HCl ([pg 40-41](#))
- d. Analyzing water quality Data ([pg 42-43](#))
  - i. Students will be assigned to a group to study some of the data listed on pg 42. Each group will complete an analysis of for its assigned data and share with whole class

Red cabbage

[https://www.teachengineering.org/view\\_activity.php?url=collection/wst\\_/activities/wst\\_environmental/wst\\_environmental\\_lesson02\\_activity3.xml](https://www.teachengineering.org/view_activity.php?url=collection/wst_/activities/wst_environmental/wst_environmental_lesson02_activity3.xml)

water quality

[https://www.teachengineering.org/view\\_lesson.php?url=collection/wst\\_/lessons/wst\\_environmental/wst\\_environmental\\_lesson02.xml](https://www.teachengineering.org/view_lesson.php?url=collection/wst_/lessons/wst_environmental/wst_environmental_lesson02.xml)

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