

Evaluating Personalized Learning Tools

Context

Four different generative AI platforms were used to create personalized learning tools to help students interpret and understand water quality data. Each tool has pros and cons based on its functionality (e.g., ability to create data visualizations, access to the web), ease of use or learning curve for the tool builder and the student, and accessibility for end user (student).

Request

Use water sample data (slide 5) to try each of the *Water Quality Coach* Tools

- a) ChatGPT
- b) Hugging Face
- c) Claude Project
- d) NotebookLM

Prompt Questions

What tool worked the best and why?

What tool worked the least and why?

What surprised you? What frustrated you?

Was there something you really wanted, but was absent or didn't work?

Rank the tools from best to least.

Note:

A water sample data collection form (slide 4) was built using Claude's artifact window to organize data in a common format.

Water Quality Coaches

ChatGPT



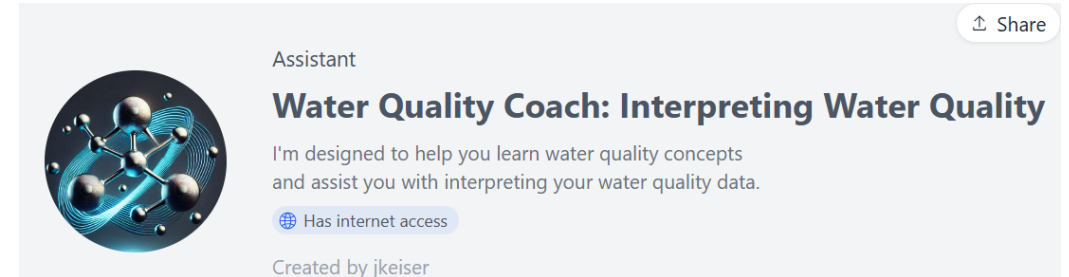
Water Quality Coach: Interpreting Water Quality

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I'm designed to help you learn water quality concepts and assist you with interpreting your water quality data.

- Allows Students to Upload Data Files
- Creates Data Visualizations
- Allows 20 specific Knowledge Sources
- Access to the Web
- Responses long and sometime inconsistent
- Requires a student to have a ChatGPT account

Hugging Face



- Students copy/paste data (no file uploads)
- No Data Visualizations
- No specific Knowledge Sources
- Access to the Web in real-time
- Responses seem more concise
- Students can access as a guest without an account

Water Quality Coaches

Claude Project



- Allows Students to Upload Data Files
- Creates Data Visualizations
- Allows many specific Knowledge Sources
- No real-time access to the Web
- Responses appear accurate and concise
- Unsure if students need an account

NotebookLM



- Students copy/paste data (no file uploads)
- No Data Visualizations
- Allows for 50 specific Knowledge Sources
- No Access to the Web (Grounded RAG tool)
- Responses seem more concise
- Unsure if students need an account

Using Claude to Create Data Collection Forms

Introduction to Physical Geology (GEOL 111)

Water Sample Data Collection Form

Student Name:

Sample 1: Tap Water

Water Source and Location:

Date and Time:

Observations:

Test Results:

pH:	<input type="text"/>
Chlorine (Cl):	<input type="text"/> ppm
Nitrate:	<input type="text"/> mg/L
Nitrite:	<input type="text"/> mg/L
Hardness:	<input type="text"/> mg/L
Free Chlorine:	<input type="text"/> mg/L
Iron:	<input type="text"/> mg/L
Copper:	<input type="text"/> mg/L
Lead:	<input type="text"/> mg/L
Alkalinity:	<input type="text"/> mg/L

Sample 2: Ground Water

Water Source and Location:

Date and Time:

Observations:

Test Results:

pH:	<input type="text"/>
Chlorine (Cl):	<input type="text"/> ppm
Nitrate:	<input type="text"/> mg/L
Nitrite:	<input type="text"/> mg/L
Hardness:	<input type="text"/> mg/L
Free Chlorine:	<input type="text"/> mg/L
Iron:	<input type="text"/> mg/L
Copper:	<input type="text"/> mg/L
Lead:	<input type="text"/> mg/L
Alkalinity:	<input type="text"/> mg/L

[Generate Report](#)

Customized Water Sample Data Collection Form

Generated Report

Click in the text area below to select all text, then copy (Ctrl+C or ⌘+C) and paste:

Introduction to Physical Geology (GEOL 111)
Water Sample Data Collection Form
=====

Student Name: _____

SAMPLE 1: TAP WATER
=====

Water Source and Location:
Date and Time:
Observations:

Test Results:

pH:
Chlorine (Cl): ppm
Nitrate: mg/L
Nitrite: mg/L
Hardness: mg/L
Free Chlorine: mg/L
Iron: mg/L
Copper: mg/L
Lead: mg/L
Alkalinity: mg/L

Evaluate Water Quality Coach Tools with common student data sets

Student 1 - Water Sample Data

Student 1

Sample 1: Tap Water

- **Water Source:** Tap Water
- **Date and Time:** 10/20 at 8:00 PM
- **Observations:** Seems like clean water
- **Test Results:**
 - pH: 7
 - Chlorine (Cl): 0 ppm
 - Nitrate: 0.5 mg/L
 - Nitrite: 0.15 mg/L
 - Hardness: 25 mg/L
 - Free Chlorine: 0 mg/L
 - Iron: 0 mg/L
 - Copper: 0.5 mg/L
 - Lead: 0 mg/L
 - Alkalinity: 40 mg/L

Sample 2: Pond Water

- **Water Source and Location:** St. Croix River Basin Pond
- **Date and Time:** 10/20 at 8:00 PM
- **Observations:** Water appears slightly murky
- **Test Results:**
 - pH: 4
 - Chlorine (Cl): 500 ppm
 - Nitrate: 5 mg/L
 - Nitrite: 1 mg/L
 - Hardness: 120 mg/L
 - Free Chlorine: 1 mg/L
 - Iron: 10 mg/L
 - Copper: 0 mg/L
 - Lead: 0 mg/L
 - Alkalinity: 120 mg/L

Student 2 - Water Sample Data

Student 2

Sample 1: Tap Water

- **Water Source and Location:** Morrison Hall Tap Water, St. Paul
- **Date and Time:** October 20, 9:00 AM
- **Observations:** Appears clean
- **Test Results:**
 - pH: 7
 - Chlorine (Cl): 0 ppm
 - Nitrate: 0 mg/L
 - Nitrite: 0.3 mg/L
 - Hardness: 25 mg/L
 - Free Chlorine: 0 mg/L
 - Iron: 0 mg/L
 - Copper: 0.5 mg/L
 - Lead: 0 mg/L
 - Alkalinity: 40 mg/L

Sample 2: Pond Water

- **Water Source and Location:** Iris Park Pond, St. Paul
- **Date and Time:** October 20, 5:30 PM
- **Observations:** Algae in the water, looks clear (not murky)
- **Test Results:**
 - pH: 7
 - Chlorine (Cl): 500 ppm
 - Nitrate: 0 mg/L
 - Nitrite: 0.15 mg/L
 - Hardness: 25 mg/L
 - Free Chlorine: 0 mg/L
 - Iron: 0 mg/L
 - Copper: 10+ mg/L
 - Lead: 20 mg/L
 - Alkalinity: 180 mg/L

Student 3 - Water Sample Data

Student 3

Sample 1: Bathroom Tap Water

- **Date and Time:** October 20 at 9:00 AM
- **Observations:** Very clear water
- **Test Results:**
 - pH: 7.0
 - Chlorine (Cl): 0 ppm
 - Nitrate: 0 mg/L
 - Nitrite: 0 mg/L
 - Hardness: 25 mg/L
 - Free Chlorine: 0 mg/L
 - Iron: 0 mg/L
 - Copper: 0.5 mg/L
 - Lead: 20 mg/L
 - Alkalinity: 240 mg/L

Sample 2: Stream Water

- **Date and Time:** October 20 at 1:45 PM
- **Observations:** Surprisingly cleaner water than expected
- **Test Results:**
 - pH: 5.0
 - Chlorine (Cl): 500 ppm
 - Nitrate: 0.5 mg/L
 - Nitrite: 0 mg/L
 - Hardness: 120 mg/L
 - Free Chlorine: 0.5 mg/L
 - Iron: 0 mg/L
 - Copper: 3 mg/L
 - Lead: 50 mg/L
 - Alkalinity: 360 mg/L