

SCH4C CHEMISTRY IN THE ENVIRONMENT

J.C PAQUIN (/USERS/JEANCLAUDE-PAQUIN)

Your tasks

- To design a lab relating to an environmental issue/concern.

Curriculum Expectations

- Evaluate the impact on society, human health, and the environment of products made using organic compounds
- Evaluate the effects of chemical substances on the environment, and analyse practical applications of qualitative analysis of matter.
- Identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.
- Evaluate the importance of government regulations, scientific analyses, and individual actions in
- Improving air and water quality, and propose a personal plan of action to support these efforts.
- Demonstrate an understanding of chemical reactions that occur in the environment as a result of both natural processes and human activities.

Work:

- Using the **Scientific Investigation approach**, you and your partner(s) will formulate a question concerning an environmental issue.
- **Initiate and Plan** - Formulate a question or hypothesis that you want to test or verify. Identify the possible dependent, independent and control variables.
- **Materials and Procedure and Safety Protocols:** Please have the **Materials/Procedure** approved by your teacher.
- **Perform and Record Observations.**
- **Critically analyse and interpret** your data and **evaluate** the reliability of your data. Draw conclusions. Identify sources of errors and ways to improve your experimental design.
- **Communicate** your findings using a formal lab report and presentation.

Work periods

- You will be given ___ work periods to work on this in class.

Assessment

- You will be graded on your understanding of the topic by completing a **Formal Lab report** (see **Course Documents for guidelines**).
1. **Title Page:** Include Title, Name, Partner(s), Teacher, Due Date and School.
 2. **Introduction:** Description of the topic. Explain your research.
 3. **Purpose:** Identify the purpose of this investigation
 4. **Hypothesis:** Prediction(s)
 5. **Materials:** List all instruments and materials required.

6. **Procedure:** Clearly identify the steps taken during the investigation.
7. **Safety Measures:** List all safety precautions.
8. **Observations:** Use Table format (Quantitative and Qualitative)
9. **Sample Calculations:** Sample Calculation(s).
10. **Graphical Analysis:** How does the independent variable affect the dependent variable.
11. **Discussion:** Discuss your findings/results. Evaluate the impact on society/ human health/ and the environment. Evaluate the importance of government regulations, scientific analysis and individual action. Identify and describe careers related to this field of science under study.
12. List possible **sources of errors** and **ways to improve** this investigation.
13. **Conclusion:** Refer to purpose, summarize your results and comment on the validity of your hypothesis.
14. **Works Cited** (Wikipedia does not count as one). Unfortunately, No Works Cited = No mark!

Topic Choices

List of Possible Environmental Topics

1. Plastic & Polymers in the Environment. It's a Biodegradable Question.
2. Clean Water – Drinking Water and how different compounds contribute to water pollution.
3. Hard Water vs Soft water.
4. Drinking Water Made Safe – Tap Water or Bottled Water? Which is safer? Is Stittsville the next Walkerton?
 1. Students tested several different water sources (bottled vs tap water) and test the different composition using a water testing kit(\$\$) and Vernier probeware (Dissolved Oxygen, Turbidity, pH etc)
 2. Students purified pond water using several different methods and test the composition using a water testing kit(\$\$) and Vernier Probeware.
5. Acid Rain on our Health & Ecosystems.
 1. Ex: the effects of acid rain on plant growth
 2. Ex: the effects of acid rain on seed germination.
6. Anthropogenic Greenhouse Gases. How eco-friendly are we?
7. Air Quality and Human Health.
8. Synthetic Fertilizers & Herbicides & Our Health. Is the Grass Always Greener and at What Cost?
9. Gasohol & the Environment – ethanol blended gasoline. Is this the right choice? Alternatives?
10. Saturated vs Unsaturated fats? Be Heart Smart? “Sponsored by ?”
11. Biomagnification - Heavy Metals (lead and mercury), PCB's and insecticides (DDT) in our food chain.
12. * The Chemistry behind Breathalyzers and lowering the Blood Alcohol Concentration. Sponsored by MADD.
13. Oil Spills and it's Environment Impact. Are we too dependent on fossil fuels. Clean up?
13. Plastics in the Oceans. Clean up?
14. Household Products and proper disposal.
15. Living off the grid... Solar Panels, Wind energy? Electrochemistry?






Other topic (Must be approved by your wonderful teacher!)



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chemistry-in-the-
environment/

RESOURCES

-  Group 1 - Students performing a pond water purification using a distillation apparatus.
(https://connex.stao.ca/sites/default/files/stao_classroom_catalyst_-_water_purification_2.jpg?width=1224px&height=1632px&iframe=true)
-  Group 1 - Students collecting purified water. (https://connex.stao.ca/sites/default/files/stao_classroom_catalyst_-_water_purification_1.jpg?width=1224px&height=1632px&iframe=true)
-  Group 2 - Effects of Acid Rain on Seed Germination - Students label their 3 Petri dishes and their Control.
(https://connex.stao.ca/sites/default/files/stao_classroom_catalyst_-_effects_of_acid_rain_on_plants_2.jpg?width=1224px&height=1632px&iframe=true)
-  Group 3 - Studying the effects of acid rain on plant growth. Using a Vernier Probe to determine the pH of their solutions.
(https://connex.stao.ca/sites/default/files/stao_classroom_catalyst_-_effects_of_acid_rain_on_plants_3.jpg?width=1224px&height=1632px&iframe=true)
-  Group 4 - Students recorded plant growth to study the effects of acid rain on seed germination.
(https://connex.stao.ca/sites/default/files/stao_classroom_catalyst_-_effects_of_acid_rain_on_plants_4.jpg?width=1224px&height=1632px&iframe=true)

ELEMENT

 Inquiry (/expert-elements/inquiry)



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