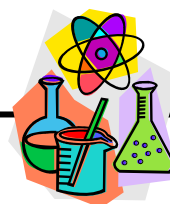


Grade 9 Unit C: Environmental Chemistry



Air and Water Quality

1. Review [Solving Societal Problems](#). Independently, or with a partner or group, select one of the following topics and research it to create a presentation for the class. See the research section of English Language Arts for help.



- Identify local, continental and/or global concerns about water and air quality, and what people are doing about these concerns.
- Identify how societies of the past, including Aboriginal groups and/or settlers, minimized the impact of human habitation on the environment by the use of biodegradable materials.
- Identify ways in which humans affect air and water quality through the use of chemicals at home and in the workplace.



Use Tools [Analyzing an Issue](#), [Note Taking III](#) or [Note Taking IV](#) and [Thinking About Form for Presentations](#).

2. Identify a community, national or international organization that is working toward making people aware of the importance of water and air quality, and/or is actively involved in cleaning up water or air. Create an organization profile that describes the organization's:

- philosophy
- history
- accomplishments and
- future projects.



3. Alberta has many laws designed to protect the environment. These laws cover such topics as:

- beverage container recycling
- conservation and reclamation
- ozone depleting substances
- pesticides sales, handling and use
- potable (drinkable) water
- waste control
- wastewater and storm drainage



Choose one of these topics and investigate the laws (regulations, acts or legislation) that explain what people can and cannot do. Summarize the key points. Look for information on Alberta government Web sites; e.g.:

<http://www.greenlearning.ca/sponsors/albertaenv.php>

4. Alberta Environment is in charge of making sure that people and businesses follow environmental laws. In addition to unannounced inspections, Alberta Environment conducts annual education and inspection programs, or sweeps, that focus on a geographic area or industry. These programs give Alberta Environment an opportunity to work together with businesses to ensure they understand the role they play in protecting our environment.

Find out about a “sweep” conducted by Alberta Environment and fill out information about the sweep below.

Sweep: _____ **date:** _____

Who was targeted?	
What did Alberta Environment find?	
Were the problems resolved?	

Acids and Bases

Acid: A chemical with a pH level below 7.

Acids cause the:

- tart taste of pop
- tang of salad dressing
- burning feeling in your muscles after exercise.



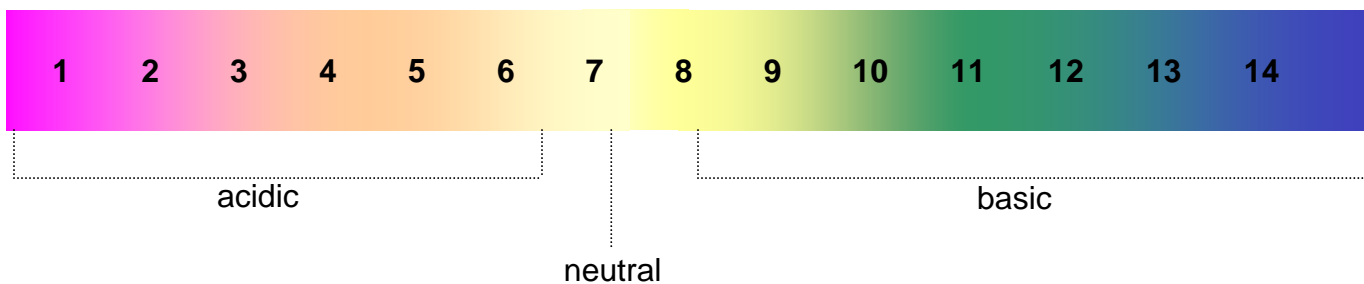
Base: A chemical with a pH level above 7.

Bases cause the:

- bitter taste of celery and radishes
- soothing feel of hand cream
- slippery feel of soap.



Litmus: A chemical indicator that turns colour when it reacts with an acid or a base. When litmus paper is dipped in a substance, the colour the paper changes to identify the substance as acidic, basic or neutral.



Power of Hydrogen (pH): The numbers along the litmus colour line that indicate the acidity level at each colour.

5. Before you begin this activity, make sure you understand the rules for [Safety in Science](#). With a partner or group, collect samples of a variety of substances from home and the workplace, such as:

- antacid medications
- cola
- milk
- lemon juice
- rain or melted snow
- tomato juice
- toothpaste
- ammonia
- drain cleaner
- tap water.

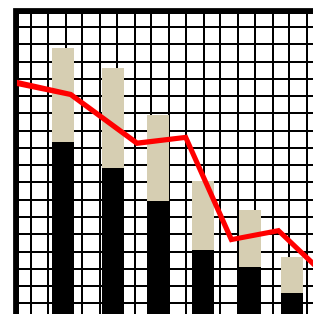


Predict which substances are acidic and which are basic. Then, use litmus paper to test each substance.

Record your predictions and create a chart, spreadsheet or graph to display the different levels of acidity in the substances.

Check out [Processing and Displaying Data](#) for tips.

Substance	Prediction	pH level



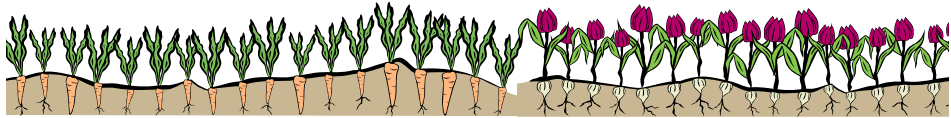
Reflect on your findings and why your predictions were correct or incorrect.

Create a statement that explains what you learned from this activity that you can apply to life at home or at work. Record it below:

6. With a partner, plan and conduct the following experiment. Before you begin, make sure you understand the process of [Scientific Inquiry](#).

Question
Are substances acidic or basic when observing their effect on tarnished coins?
Hypothesis/prediction
Materials
<ul style="list-style-type: none">• 5 tarnished or dirty pennies• 5 containers• litmus paper• lemon juice• vinegar• peroxide• rubbing alcohol• cola
Procedure
<ol style="list-style-type: none">1. Predict which sample substances are basic or acidic.2. Fill the containers with the same volume of each of the five liquid samples.3. Drop a tarnished penny into each container.4. Record your observations every two minutes for 10 minutes.5. Test the substances with litmus paper and record your findings.
Diagram/sketch
Results: List below or on a separate page. Use a chart and/or graph to show your results.
<hr/> <hr/>
Conclusion: Compare findings with prediction and classmates' results. Write a conclusion and/or inference statement.
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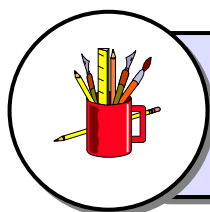
7. With a partner or by yourself, plan and conduct the following experiment. Before you begin, make sure you understand the process of [Scientific Inquiry](#).

Objective/question/ problem/issue	
What is the pH level in various soil samples?	
Hypothesis/prediction	
Materials	
<ul style="list-style-type: none"> • samples of a variety of soils (samples from different gardens, different types of potting soils) • litmus paper • containers • water 	
	
Procedure	Diagram/Sketch
<ol style="list-style-type: none"> 1. Fill the containers with the same amount of each of the soil samples. 2. Pour the same amount of water into each container and mix to make liquid solutions. 3. Leave for 24 hours or longer. 4. Test each sample with litmus paper. 5. Record your observations. 	
Results: List below or on a separate page. Use a chart and/or graph to show your results.	
Analysis: Compare findings with prediction and classmates' results. Write a conclusion and/or inference statement.	
Generalize: Pose further questions, or suggest how this information relates to other situations.	

8. Use the Internet and other sources to find the answer to one of the following questions. Present your findings to the class.

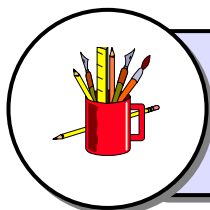
- Why is the pH level important in an aquarium?
- Why do gardeners check the pH level of their soil frequently?
- How can the pH level in soap or shampoo affect skin and hair?
- Why do many large cities monitor the pH levels of rain?
- How does a pH imbalance in the stomach cause medical problems such as ulcers?

As a class, discuss: **What are the effects of acids and bases on living things?**



Use Tools [Finding Sources](#), [Preparing for an Internet Search](#) and [Note Taking VI](#).

9. Acids and bases found in nature have been used as natural medicines by Aboriginal peoples as well as other cultures. Invite a guest speaker, such as an Elder or a naturopath, to talk about the remedies still used today.



Use Tools [Preparing for Listening I](#) or [Preparing for Listening II](#), and [Listening for Main Ideas](#).