

Grade 9

Activity: **A Grave Mistake**

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The Changing Earth
How do materials cycle through the Earth's systems?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.7 Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles. >The cyclical movement of matter between reservoirs is driven by the Earth's internal and external sources of energy.</p>	<ol style="list-style-type: none"> Analyze data to trace the flow of contaminants in ground water. Conclude that past solutions, developed with the best intentions, may create contemporary problems. 	<p>D19. Explain how chemical and physical processes cause carbon to cycle through the major earth reservoirs.</p> <p>D20. Explain how solar energy causes water to cycle through the major earth reservoirs.</p>

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. >Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution.</p>	<ol style="list-style-type: none"> Analyze data to trace the flow of contaminants in ground water. Conclude that past solutions, developed with the best intentions, may create contemporary problems. 	<p>D22. Explain how the release of sulfur dioxide (SO₂) into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D24. Explain how the accumulation of mercury, phosphates and nitrates affect the quality of water and the organisms that live in rivers, lakes and oceans.</p>

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Analyze data to trace the flow of contaminants in ground water. 2. Conclude that past solutions, developed with the best intentions, may create contemporary problems. 	<p>D25. Explain how land development, transportation options and consumption of resources may affect the environment.</p>

Activity: **Back to the Future**

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The Changing Earth
How do materials cycle through the Earth's systems?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.7 Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles. >The cyclical movement of matter between reservoirs is driven by the Earth's internal and external sources of energy.</p>	<ol style="list-style-type: none"> 1. Analyze and interpret stream flow data 2. Identify the risks and benefits of development in a floodplain. 	<p>D20. Explain how solar energy causes water to cycle through the major earth reservoirs.</p>

Activity: **Back to the Future**

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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> Analyze and interpret stream flow data Identify the risks and benefits of development in a floodplain. 	<p>D25. Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **Color Me a Watershed**

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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. >Emission of combustion by-products, such as SO₂, CO₂, and NO_x by industries and vehicles is a major source of air pollution. >Accumulation of metal and non-metal ions used to increase agricultural</p>	<ol style="list-style-type: none"> Recognize that population growth and settlement cause changes in land use. Analyze how land use variations in a watershed can affect the runoff of water. 	<p>D22. Explain how the release of sulfur dioxide into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D24. Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>

productivity is a major source of water pollution.		
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Activity: **Color Me a Watershed**

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of Earth systems.</p> <p>> New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Recognize that population growth and settlement cause changes in land use. 2. Analyze how land use variations in a watershed can affect the runoff of water. 	<p>D25. Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **Dilemma Derby**

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standards (focus of standard)	Activity Objectives (from Project WET activity)	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth's systems.</p> <p>>New technologies and changes in lifestyle can have positive/negative</p>	<ol style="list-style-type: none"> 1. Outline reasons why managing water resources can create dilemmas. 2. Identify, analyze, and select actions related to a water resource dilemma. 	<p>D25 Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D26 Describe human efforts to reduce the</p>

effects on the environment.		consumption of raw materials and improve air and water quality.
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Activity: **Easy Street**

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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards (focus of standard)	Activity Objectives (from Project WET activity)	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled but others accumulate in the environment and may affect the balance of the Earth’s systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<p>1. Compare and contrast contemporary and historical water uses. 2. Identify water conservation strategies.</p>	<p>D25 Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D26 Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **Get the Ground Water Picture**

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. >Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution.</p>	<ol style="list-style-type: none"> 1. Identify the parts of a ground water system. 2. Compare movement of water through diverse substrates. 3. Relate different types of land uses to potential ground water contamination. 	<p>D22. Explain how the release of sulfur dioxide (SO₂) into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D24. Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>

Activity: **Get the Ground Water Picture**

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Identify the parts of a ground water system. 2. Compare movement of water through diverse substrates. 3. Relate different types of land uses to potential ground water contamination. 	<p>D25 Explain how land development, transportation options and consumption of resources may affect the environment.</p>

Activity: **Hangin' Together**

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Properties of Matter

How does the structure of matter affect the properties and uses of materials?

Content Standards (focus of standard)	Activity Objectives (from Project WET activity)	CMT Correlation/Expected Performances
<p>9.4 Atoms react with one another to form new molecules. >Atoms have a positively charged nucleus surrounded by negatively charged electrons. >The configuration of atoms and molecules determines the properties of the materials.</p>	<ol style="list-style-type: none"> 1. Illustrate the structure and intermolecular forces of the water molecule in relation to hydrogen bonding. 2. Explain the role of hydrogen bonding and its relationship with some of the unique characteristics of water. 3. Deduce how these unique molecular properties of water are critical to life on Earth. 	<p>D11. Describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding).</p>

Activity: **Hot Water**

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Science and Technology

How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. >Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution.</p>	<ol style="list-style-type: none"> 1. Apply basic principles and strategies in debating water resource issues. 2. Recognize the effectiveness of reason-based versus emotion 	<p>D22. Explain how the release of sulfur dioxide into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D24. Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>

Activity: **Hot Water**

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Science and Technology

How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Apply basic principles and strategies in debating water resource issues. 2. Recognize the effectiveness of reason-based versus emotion 	<p>D25. Explain how land development, transportation options, and consumption of resources may affect the environment.</p> <p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **People of the Bog**

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Properties of Matter

How does the structure of matter affect the properties and uses of materials?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.4 Atoms react with one another to form new molecules. >The configuration of atoms and molecules determines the properties of the materials.</p>	<ol style="list-style-type: none"> 1. Describe characteristics of bog environments. 2. Explain the conditions of bogs that allow for the preservation of artifacts from the past. 3. Compare the rates of decomposition of articles in aerobic and anaerobic environments. 	<p>D12. Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.</p>

Activity: **Perspectives**

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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Recognize that people have differing values regarding water resource management issues. 2. Evaluate strengths and weaknesses of proposed solutions to water resource management issues. 3. Describe purposes of diverse advocacy groups and summarize their similarities and differences. 	<p>D25. Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **Sparkling Water**

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Properties and Matter
 How does the structure of matter affect the properties and uses of materials?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.4 Atoms react with one another to form new molecules. > The configuration of atoms and molecules determines the properties of the materials.</p>	<ol style="list-style-type: none"> 1. Describe the processes for treating wastewater. 2. Compare how water is cleaned in the water cycle to how it is cleaned in contemporary water treatment systems. 3. List nontoxic household cleaning methods. 	<p>D12. Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.</p>

Activity: **Sparkling Water**

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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.6 Chemical technologies present both risks and benefits to the health and well-being of humans, plants, and animals. > The products of chemical technologies include synthetic fibers, pharmaceuticals, plastics and fuels.</p>	<ol style="list-style-type: none"> 1. Describe the processes for treating wastewater. 2. Compare how water is cleaned in the water cycle to how it is cleaned in contemporary water treatment systems. 3. List nontoxic household cleaning methods. 	<p>D18. Explain the short-and long-term impacts of landfills and incineration of waste materials on the quality of the environment.</p>

Activity: **Sparkling Water**

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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Describe the processes for treating wastewater. 2. Compare how water is cleaned in the water cycle to how it is cleaned in contemporary water treatment systems. 3. List nontoxic household cleaning methods. 	<p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **Super Bowl Surge**

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Properties of Matter

How does the structure of mater affect the properties and uses of materials?

Content Standard	Activity Objectives	CMT Correlation/Expected Performances
<p>9.4 Atoms react with one another to form new molecules. >The configuration of atoms and molecules determines the properties of the materials.</p>	<ol style="list-style-type: none"> 1. Illustrate how demands on some treatment plants cause overflow. 2. Explain problems with sewage overflow. 3. Propose solutions to a water management problem. 4. Recognize how presentation strategies influence public policy. 	<p>D12. Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.</p>

Activity: **Super Bowl Surge**

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The Changing Earth

How do materials cycle through the Earth's systems?

Content Standard	Activity Objectives	CMT Correlation/Expected Performances
<p>9.7 Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles. >The cyclical movement of matter between reservoirs is driven by the Earth's internal and</p>	<ol style="list-style-type: none"> 1. Illustrate how demands on some treatment plants cause overflow. 2. Explain problems with sewage overflow. 3. Propose solutions to a water management problem. 4. Recognize how presentation strategies influence public policy. 	<p>D20. Explain how solar energy causes water to cycle through the major earth reservoirs.</p>

external sources of energy.		
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Activity: **Super Bowl Surge**

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standard	Activity Objectives	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. >Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution.</p>	<ol style="list-style-type: none"> 1. Illustrate how demands on some treatment plants cause overflow. 2. Explain problems with sewage overflow. 3. Propose solutions to a water management problem. 4. Recognize how presentation strategies influence public policy. 	<p>D24 Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>

Activity: **The Long Haul**

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Science and Technology in Society
How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of</p>	<ol style="list-style-type: none"> 1. Develop an awareness of various volumes of water. 2. Appreciate today’s readily available water supplies. 3. Relate how easy access to 	<p>D25. Explain how land development, transportation options and consumption of resources may affect the environment.</p>

<p>the Earth systems. > New technologies and changes in lifestyle can have positive and/or negative effects in the environment.</p>	<p>water can encourage people to use large amounts of water.</p>	<p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>
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Activity: **The Price Is Right**

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Science and Technology in Society

How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Recognize that cost and the environmental considerations influence the planning and construction of water projects. 2. Calculate the costs involved in supplying clean water to consumers and removing wastewater. 	<p>D25. Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **The Pucker Effect**

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Science and Technology in Society

How do science and technology affect the quality of our lives?

Content Standards (focus of standard)	Activity Objectives (from Project WET activity)	CMT Correlation/Expected Performances
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<p>9.6 Chemical technologies present both risks and benefits to the health and well-being of humans, plants, and animals. >The products of chemical technologies include synthetic fibers, pharmaceuticals, plastics and fuels.</p>	<ol style="list-style-type: none"> 1. Describe how underground point source pollutants move through ground water. 2. Analyze data from test wells they have “drilled” to identify point source contamination. 	<p>D18. Explain the short- and long-term impacts of landfills and incineration of waste materials on the quality of the environment.</p>
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Activity: **Water Court**
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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. >Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution.</p>	<ol style="list-style-type: none"> 1. Demonstrate how disputes regarding water quality and quantity can be settled through mediation or litigation. 2. Develop and present an argument supporting their view relevant to a water-related issue. 3. Evaluate arguments presented by people on opposing sides of an issue. 	<p>D22. Explain how the release of sulfur dioxide into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D24. Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>

Activity: **Water Court**
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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<ol style="list-style-type: none"> 1. Demonstrate how disputes regarding water quality and quantity can be settled through mediation or litigation. 2. Develop and present an argument supporting their view relevant to a water-related issue. 3. Evaluate arguments presented by people on opposing sides of an issue. 	<p>D25 Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>D26. Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

Activity: **Wet Vacation**

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Science and Technology in Society

How do science and technology affect the quality of our lives?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. > Emission of combustion by-products, such as SO₂, CO₂ and NO_x by industries and vehicles is a major source of air pollution. >Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution.</p>	<ol style="list-style-type: none"> 1. Identify factors that affect temperature and precipitation patterns. 2. Analyze how weather conditions influence tourism. 	<p>D22. Explain how the release of sulfur dioxide into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D23. Explain how the accumulation of carbon dioxide in the atmosphere increases Earth’s “greenhouse” effect and may cause climate changes.</p> <p>D24. Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>

Activity: **What’s the Solution?**

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How do materials cycle through the Earth's system?

Content Standards	Activity Objectives	CMT Correlation/Expected Performances
<p>9.7 Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles. >Elements on Earth exist in essentially fixed amounts and are located in various chemical reservoirs.</p>	<p>1. Discriminate solutions from other mixtures. 2. Demonstrate the water's ability to dissolve solids, liquids and gases.</p>	<p>D20. Explain how solar energy causes water to cycle through the major earth reservoirs.</p>

Activity: **Where Are the Frogs?**

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Science and Technology in Society

How do science and technology affect the quality of our lives?

Content Standards (focus of standard)	Activity Objectives (from Project WET activity)	CMT Correlation/Expected Performances
<p>9.8 The use of resources by human populations may affect the quality of the environment. >Emission of combustion by-products, such as SO₂, CO₂, and NO_x by industries and vehicles is a major source of air pollution.</p>	<p>1. Illustrate the meaning of pH. 2. Analyze the effects of acidic water on plant and animal life. 3. Describe how acid rain can affect ecosystems.</p>	<p>D22. Explain how the release of sulfur dioxide (SO₂) into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.</p> <p>D24. Explain how the accumulation of mercury, phosphates, and nitrates affects the quality of water and the organisms that live in rivers, lakes, and oceans.</p>

Activity:

Whose Problem is it?

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Science and Technology in Society
 How do science and technology affect the quality of our lives?

Content Standards (focus of standard)	Activity Objectives (from Project WET activity)	CMT Correlation/Expected Performances
<p>9.9 Some materials can be recycled, but others accumulate in the environment and may affect the balance of Earth systems. >New technologies and changes in lifestyle can have positive and/or negative effects on the environment.</p>	<p>1. Analyze how water issues affect individuals as well as world populations, and how these issues can have short-and/or long-term implications. 2. Illustrate the scope and duration of water-related issues.</p>	<p>D25 Explain how land development, transportation options and consumption of resources may affect the environment. D26 Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p>

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