

NOTE: Visit vimeo.com/kidcurators to watch a video story of this project.

Museum Topic: The Environment

Big Idea: Humans can hurt or help the environment.

Story Line:

1. Freshwater is a limited resource.
2. Environmental decisions influence the way we protect biodiversity.
3. The handling of solid wastes has an environmental impact.
4. Outdoor and indoor pollution affects many people
5. Global warming can have an impact on our water, air, land, and people.
6. There are renewable and non-renewable energy resources now and in the future.

Focus Questions:

1. What is the environmental impact that individuals, families, communities, governments, and businesses have on Lake Michigan?
2. How is biodiversity impacted by human decisions?
3. What is the environmental impact of the current waste disposal systems and recycling in managing solid waste disposal? (Specifically at Elmwood School, New Berlin Public Schools, New Berlin, and the greater Waukesha County?)
4. How does outdoor and indoor air pollution impact people?
5. What is the impact that global warming is having on our water, air, land, and people?
6. What are some of the energy resources of the future? What are some of the decisions that impact conservation of energy for the future?

Statements of expected student learning / Research Questions

FOCUS QUESTION #1: What is the environmental impact that individuals, families, communities, governments, and businesses have on Lake Michigan?	
Statements of expected student learning	Student research questions developed by Elmwood 6th graders
Fresh water is a limited resource.	<ul style="list-style-type: none"> ▪ What percentage of the earth's total water supply is fresh water? ▪ How much of this fresh water supply is in Lake Michigan? ▪ What would we do if we didn't Lake Michigan's fresh water?
Most water pollution is a result of human activities in households and industry.	<ul style="list-style-type: none"> ▪ Is there a limit to how much dumping factories and industry can do? ▪ Why do factories and industry pollute when they know it is harmful? How can we stop it? ▪ What are the specific pollutants in Lake Michigan? ▪ Have we always had pollution in Lake Michigan? Is it getting better or worse? How does it compare to that of other fresh water lakes? ▪ Can we afford to clean up Lake Michigan? Can we afford to?
The keys to keeping water clean are proper sewage treatment, the reduction of pollutants, and	<ul style="list-style-type: none"> ▪ How does a water treatment plan treat wastewater? ▪ How do industries recycle waste? ▪ How does New Berlin's sewage plant work?

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Exhibit Content by Elmwood Elementary School 6th grade team, New Berlin, WI, and Kid Curators, LLC

NOTE: Some statements of expected student learning were taken from: Prentice Hall Science Explorer:

Environmental Science, Pearson Education, Inc., publishing as Pearson Prentice Hall, Upper Saddle River, New Jersey, 2005

the effective cleanup of oil and gasoline spills.	<ul style="list-style-type: none"> ▪ How can oil spills be cleaned without harming living species? ▪ Have scientists figured out how to clean up other fresh water lakes? ▪ How do boat fuels harm Lake Michigan?
There is a Great Lakes Water Quality Agreement for each of the Great Lakes.	<ul style="list-style-type: none"> ▪ What is the Water Quality Agreement? ▪ How does it reduce the amount of pollution? ▪ Are there rules? Do communities have to follow them? New Berlin? ▪ Is the agreement working? ▪ Are the Great Lakes doing better because of it? Lake Michigan?

<p>FOCUS QUESTION #2: How is biodiversity impacted by human decisions? (Specifically, Neotropical (forest-dwelling) birds during their migration before and during the winter months? NOTE: Students used curriculum from: <i>One Bird Two Habitats: A Middle School Environmental Education Curriculum on Neotropical Migratory Birds.</i>)</p>	
Statements of expected student learning	Student research questions developed by Elmwood 6th graders
The number of different species in an area is called its biodiversity.	<ul style="list-style-type: none"> ▪ What bird species are in the Neotropical area? ▪ What is biodiversity in relationship to birds? ▪ How does biodiversity help living things?
Factors that affect biodiversity in an ecosystem include area, climate, and diversity of niches.	<ul style="list-style-type: none"> ▪ Why do these factors affect biodiversity? ▪ How does biodiversity affect diversity of niches? ▪ How can we protect biodiversity?
Human activities such as habitat destruction, poaching, pollution, the introduction of exotic species can threaten biodiversity.	<ul style="list-style-type: none"> ▪ Why do humans destroy habitats? ▪ How do habitat destruction, poaching, pollution, and the introduction of exotic species affect birds? ▪ How can exotic species be threatened? How can exotic species threaten other species?
Human activities such as captive breeding, laws, and treaties habitat preservation can protect biodiversity.	<ul style="list-style-type: none"> ▪ What happens if there is an overpopulation of a species? ▪ When habitats are destroyed, how does it affect remaining species? ▪ What are the effects of captive breeding on biodiversity? ▪ How do animals that are captively bred act in the wild?
Climate has a large role in the types of organisms found in a biome.	<ul style="list-style-type: none"> ▪ What is a biome? ▪ What types of climates are in these biomes? ▪ How does the variety of plant and animal species coexist? ▪ What are some of the patterns of climates in the biomes? ▪ Can the climate change within a biome? ▪ What are the temperature and precipitation patterns of an area?
Migratory birds face a decline when they travel long distances.	<ul style="list-style-type: none"> ▪ What are migratory birds? ▪ Is migration only when a bird flies down south? ▪ Do birds fly until they feel comfortable with the temperature? ▪ Do birds know where to travel? Do they have a specific path? ▪ Does climate change affect where the birds go year to year? ▪ Do different kinds of birds travel to different areas? ▪ How do birds communicate with each other when traveling? ▪ What migratory birds travel from Wisconsin to other locations? ▪ Where do some birds stay during the winter? ▪ How are forests being managed during their migratory times?

FOCUS QUESTION #3: What is the environmental impact of the current waste disposal systems and recycling in managing solid waste disposal? (Specifically at Elmwood, New Berlin Public Schools, New Berlin, and the greater Waukesha county?)	
Statements of expected student learning	Student research questions developed by Elmwood 6th graders
Three methods of handling solid waste are burning (incineration), burying (sanitary landfill) and recycling.	<ul style="list-style-type: none"> ▪ How do incineration facilities handle solid waste disposal? What are the advantages and disadvantages? ▪ How do sanitary landfill facilities handle solid waste disposal? What are the advantages and disadvantages of recycling? Landfills Burning?
Individuals can help the solid waste problem by reducing, reusing, and recycling.	<ul style="list-style-type: none"> ▪ What do garbage companies do with garbage and recyclables? ▪ What are plans for the future of recycling and waste disposal? ▪ Does anything happen to people who do not recycle?
Elmwood, the New Berlin Public Schools, the city of New Berlin, and Waukesha county have specific plans for managing solid wastes.	<ul style="list-style-type: none"> ▪ Does Elmwood School have an incinerator? ▪ What does the city of New Berlin do with landfills that fill? ▪ How does Elmwood School, the New Berlin Schools, and the city of New Berlin handle hazardous waste? ▪ What can be done to possibly change the fact that most restaurants in New Berlin have plastic and Styrofoam for take-outs? ▪ What can people do to control the solid waste problem? ▪ Are there any improvements that could be suggested?

FOCUS QUESTION #4: How does outdoor and indoor air pollution impact people?	
Statements of expected student learning	Student research questions developed by Elmwood 6th graders
<p>The primary air pollutants found in most urban areas are carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons, and particulate matter (both solid and liquid).</p> <p>Acid rain is a general term to describe precipitation that has a pH lower than 5.4. Pure water has a pH of 7.</p> <p>The key to reducing outdoor air pollution is to control emissions from factories and vehicles.</p>	<ul style="list-style-type: none"> ▪ What are some of the major health issues concerning air pollution? ▪ How much indoor and outdoor pollution do we create each day in New Berlin? ▪ How can smog, acid rain, and temperature inversion be controlled? ▪ What other pollution causes smog other than cars? ▪ What are the major sources of outdoor air pollution? ▪ How much of a reduction of air pollution do we have to have to make to help the ozone regain "normalcy" within the next 100 years? ▪ If humans keep up with what we are doing, how much longer until we lose the whole ozone? ▪ Which country is the leader in contributing to outdoor air pollution?
The Environmental Protection Agency (EPA) reported that toxic chemicals found in the air of almost every American home are three times more likely to cause some type of cancer than outdoor air pollutants.	<ul style="list-style-type: none"> ▪ What is the Environmental Protection Agency? ▪ What laws have they created? ▪ What are the major causes of indoor air pollution? ▪ Does our government have any laws that address indoor air pollution? ▪ Does our government have any jobs that are dedicated to addressing indoor pollution?

FOCUS QUESTION #5 What is the impact that global warming is having on our water, air, land, and people?	
<i>Statements of expected student learning</i>	<i>Student research questions developed by Elmwood 6th graders</i>
Human activities that increase carbon dioxide levels add to the greenhouse effect.	<ul style="list-style-type: none"> ▪ What specifically is the greenhouse effect? ▪ What are the human activities that have been linked to the greenhouse effect? ▪ Why do carbon dioxide levels add to the greenhouse effect? ▪ What is the ozone layer and how does it protect us?
Chlorofluorocarbons, also known as Freons, are greenhouse gases that contribute to global warming.	<ul style="list-style-type: none"> ▪ What specifically are chlorofluorocarbons? ▪ How do greenhouse gases effect global warming? ▪ What causes the ozone layer to thin? ▪ What is the ozone hole? How has it changed since first discovered? ▪ What might be the three major consequences of global warming? ▪ What are fossil fuels?
Affects from global warming can be positive and negative.	<ul style="list-style-type: none"> ▪ What are some positive / negative effects from global warming? ▪ Does the government have mandates to deal with global warming?

FOCUS QUESTION #6: What are some of the energy resources of the future? What are some of the decisions that impact conservation of energy for the future?	
<i>Statements of expected student learning</i>	<i>Student research questions developed by Elmwood 6th graders</i>
We can preserve our current energy resources by increasing the efficiency of our energy use and by reducing energy use when possible.	<ul style="list-style-type: none"> ▪ How efficient are our current energy resources? ▪ How efficient do they need to be? ▪ What are ways people can increase the efficiency of energy use? ▪ What are some ways in which people can reduce energy use? ▪ What are the competing needs of the environment and people when considering whether or not to conserve energy? ▪ What are the benefits (pros) and costs (cons) of these choices? ▪ How can the American people be convinced to conserve energy? ▪ What are some resources that future generations might need?
There are non-renewable and renewable energy sources.	<ul style="list-style-type: none"> ▪ How do fuels provide energy? ▪ Why are fossil fuels considered nonrenewable resources? ▪ Why are solar, hydroelectric, and geothermal energy sources considered renewable? ▪ What are some examples of the way individuals and governments have tried to solve some of the fossil fuel problems? ▪ What resources will we run out of? Not run out of? ▪ How much ethanol (corn) will we need now and in the future?
Nuclear energy does not produce greenhouse gas emissions, but it does create its own environmental problems.	<ul style="list-style-type: none"> ▪ What happens during a nuclear fission reaction? ▪ How does a nuclear power plant produce electricity? ▪ How does a nuclear fusion reaction occur? ▪ What problems will nuclear energy create?
What are some additional energy sources of the future?	<ul style="list-style-type: none"> ▪ What are some additional energy sources of the future? ▪ What type of impact will these energy sources have on air, water, land pollution, as well as humans?