

Environmental Science – Yots

You have been assigned 3 assignments. Below are the directions for each:

Assignment #1 – Energy Sources Research

Use any Internet source to find the information indicated in the chart. Write a description of each power source for column 1, write 2 advantages for column 2 and 2 disadvantages for column 3. Use any site to find the answers to the questions before and after the chart.

Assignment #2 – Climate Change Webquest

Use the link at the top of the page to answer the questions. If you are having difficulty navigating the web site, find the answers using any site you want.

Assignment #3 – Learning from Love Canal Article and Questions

Read the article and answer questions 1 – 23.

Name _____

Energy Sources Research

1. What is the difference between nonrenewable and renewable resources?

2. Examples of nonrenewable resources:

3. Examples of renewable resources:

FILL OUT THE FOLLOWING CHART:

POWER/ FUEL SOURCE AND DESCRIPTION	ADVANTAGES – 2 MORE FOR EXTRA CREDIT	DISADVANTAGES - 2 MORE FOR EXTRA CREDIT
NUCLEAR		
FOSSIL FUELS - COAL		
FOSSIL FUELS – OIL		
SOLAR		

WIND		
BIOMASS		
HYDROELECTRICITY		
GEOHERMAL		
TIDAL		

OCEAN THERMAL		
HYDROGEN		

PAGE 504: EXPLAIN HOW ENERGY CAN BE CONSERVED BY THE FOLLOWING:
CITIES AND TOWNS:

AROUND THE HOME

DAILY LIFE

PAGE 503: EXPLAIN HOW A HYBRID CAR WORKS:

Name _____

Climate Change Webquest

<https://climate.nasa.gov>

Scroll down to "What is Climate Change?"

Click on "Evidence"

1. For centuries, atmospheric carbon dioxide had never been above how much? _____
2. Starting at which year has the amount been steadily increasing?

3. Most climate change throughout history can be attributed to what?

4. How do greenhouse gases contribute to global warming? _____

5. What information does the paleoclimate reveal?

6. How much has the planet's average surface temperature risen?

7. When have the 5 warmest years taken place? _____
8. How much have the oceans warmed? _____
9. How much ice has been lost from Greenland and Antarctica?

10. What is happening to glaciers? _____
11. Explain what is happening to snow cover:

12. How much has global sea level risen in the last century? _____
13. Extreme events: Explain what has been happening since 1950: _____

14. Why is the acidity of the oceans rising? _____

Click on "Causes"

15. Define greenhouse effect:

16. List gases that contribute to greenhouse effect:

17. Which is the most abundant greenhouse gas? _____

18. List ways that carbon dioxide gets released:

19. List 4 ways that methane is released:

20. List 2 ways nitrous oxide is released:

21. Explain the origin of CFCs and tell which atmospheric layer they destroy:

22. Name 3 human activities that increase carbon dioxide:

23. How will individual regions vary in climate?

24. What could be another cause of climate change?

25. How has the answer to #24 been shown to be false?

26. Why is a 2 F difference actually a big deal?

27. Describe the changes in precipitation pattern for the northern US:

28. What is expected for the Southwestern US?

29. Describe the change in hurricanes:

30. How much will the sea level rise? _____

31. What are 3 effects of sea level rising?

32. What is likely to become ice free?

33. Describe the changes in the area of the US where you live:

34. Watch "Earth 360 video: The Call of Science" and write a 4 sentence reaction:

Learning from Love Canal Questions- Answer on a separate sheet of paper – All answers are in order from the article.

1. Describe Lois Gibbs in 2 sentences.
2. What were some of the effects on humans from low level chemical exposure?
3. The citizens of Love Canal provided an example of what?
4. What is the main lesson to be learned from Love Canal?
5. How and when did the Love Canal crisis begin?
6. What was the canal originally going to be used for and why was the project abandoned?
7. What did Hooker Chemical Corporation use the site for?
8. How many different chemicals were found?
9. List the chemicals found.
10. Why would the board of education build a school near the perimeter of the canal?
11. What did Lois Gibbs discover as she walked door to door?
12. What did the media attention result in?
13. What happened on August 2, 1978?
14. How many families were evacuated?
15. What done during the first attempts to clean the dumpsite?
16. How many children born between 1974 and 1978 suffered birth defects?
17. Why didn't the many levels of government want to evacuate the people in the community?
18. Why does Lois Gibbs think the decision to move back to Love Canal is an appalling idea?
19. How much waste remains in the dump?
20. What dictated the actions at Love Canal?
21. What should you do if you are ever in doubt about what a company is doing?
22. What ailments are children suffering from more than ever before?
23. What is the challenge for the next decade?

Learning from Love Canal: A 20th Anniversary Retrospective

by Lois Marie Gibbs

Sometimes circumstances create reluctant heroes. In 1978 Lois Marie Gibbs saw herself framed by the American dream--a wife and mother who worked hard and sacrificed to own a home in a typical suburban neighborhood. She was not a political activist, and she had never given a public speech. The situation at Love Canal, New York, led this "ordinary" woman to do extraordinary things, and when all was said and done she had become a symbol of what happens when citizens, provoked by injustice and emboldened by outrage, stand up for themselves and their families. Known to many as the "Mother of Superfund," her story is one of legend, and not only because of her relentless demand for the truth that opened the eyes of an entire nation. Her actions, and the actions of her neighbors who formed the Love Canal Homeowner's Association, demonstrate how one committed person--one committed community--can change the course of history.

Twenty years ago the nation was jolted awake when a blue-collar community uncovered a serious public health crisis resulting from the burial of chemical wastes in their small suburban neighborhood. As the events unfolded, network television, radio, and print media covered the David and Goliath struggle in Love Canal, New York. The country watched as mothers with children in their arms and tears in their eyes cried out for help.

The words "Love Canal" are now burned in our country's history and in the memory of the public as being synonymous with chemical exposures and their adverse human health effects. The events at Love Canal brought about a new understanding among the American people of the correlation between low-level chemical exposures and birth defects, miscarriages, and incidences of cancer. The citizens of Love Canal provided an example of how a blue-collar community with few resources can win against great odds (a multi-billion-dollar international corporation and an unresponsive government), using the power of the people in our democratic system.

Now, 20 years later, science has shown that some of the same chemicals found at Love Canal are present in our food, water, and air. As important now as ever, the main lesson to be learned from the Love Canal crisis is that in order to protect public health from chemical contamination, there needs to be a massive outcry--a choir of voices--by the American people demanding change.

The Love Canal crisis began in the spring of 1978 when residents discovered that a dump site containing 20,000 tons of chemical wastes was leaking into their neighborhood. The local newspaper ran an extensive article, explaining that the dump site was once a canal that connected to the Niagara River five miles upstream of Niagara Falls. This canal, 60 feet wide and 3,000 feet long, was built by William T. Love in the 1800s in an attempt to connect the upper and lower Niagara River. Mr. Love ran out of money before completing the project, and the abandoned canal was sold at public auction, after which it was used as a municipal and chemical dump site from 1920 until 1953. Hooker Chemical Corporation, a subsidiary of Occidental Petroleum, was the principal disposer of chemical wastes at the site. Over 200 different chemicals were deposited, including pesticides such as lindane and DDT (both since banned from use in the U.S.), multiple solvents, PCBs, dioxin, and heavy metals.

In 1953, after filling the canal and covering it with dirt, Hooker sold the land to the Niagara Falls Board of Education for one dollar. Included in the deed was a "warning" about the chemical wastes buried on the property and a disclaimer absolving Hooker of any future liability. The board of education, perhaps not understanding the potential risks associated with Hooker's chemical wastes, built an elementary school near the perimeter of the canal in 1954. Home building around the canal also began in the 1950s, and by 1978, there were approximately 800 single-family homes and 240 low-income apartments, with about 400 children attending the 99th Street School next to the dump.

After reading the newspaper article about Love Canal in the spring of 1978, I became concerned about the health of my son, who was in kindergarten at the 99th Street School. Since moving into our house on 101st Street, my son, Michael, had been constantly ill. I came to believe that the school and playground were making him sick. Consequently, I asked the school board to transfer Michael to another public school, and they refused, stating that "such a transfer would set a bad precedent."

Receiving no help from the school board, city, or state representatives, I began going door to door with a petition to shut down the 99th Street School. The petition, I believed, would pressure the school board into investigating the chemical exposure risks to children and possibly even into closing the school. It became apparent, after only a few blocks of door knocking, that the entire neighborhood was sick. Men, women, and children suffered from many conditions--cancer, miscarriages, stillbirths, birth defects, and urinary tract diseases. The petition drive generated news coverage and helped residents come to the realization that a serious problem existed. The media attention and subsequent inquiries by residents prompted the New York State Department of Health (NYSDOH) to undertake environmental testing in homes closest to the canal.

On August 2, 1978, the NYSDOH declared a state of emergency at Love Canal, ordering closure of the 99th Street School, recommending that pregnant women and children under the age of two evacuate, and mandating that a cleanup plan be undertaken immediately. These pronouncements, based on the unsafe level of chemicals found in the air of 239 homes and the soils in yards located closest to the canal, were devastating to pregnant women and families with small children.

Other residents were panicked about the risk of disease to their three, five, and ten year olds--and themselves--pleading, "Our fetuses are our canaries and you are removing the canaries. Why are you leaving the rest of us here to die?" The health department, unable to justify their age-specific decisions scientifically, and Governor Carey, feeling tremendous pressure from the public, agreed on August 7 to evacuate all 239 families, regardless of the number or age of children in the households.

In October cleanup began on the dump site. A drainage trench was installed around the perimeter of the canal to catch waste that was permeating into the surrounding neighborhood. A clay cap was placed on top of the site to reduce water infiltration from rain or melting snow. Sewer lines and the creek to the north of the canal were also cleaned up. However, the waste that had migrated throughout the neighborhood and into the homes remained.

At that time, there were approximately 660 families living in the community who were not given the option to relocate. They continued to pressure the governor and federal authorities, including President Carter, to expand the evacuation

area. A health study was conducted by volunteer scientists and community members, revealing that 56 percent of children born between 1974 and 1978 suffered birth defects. The miscarriage rate increased 300 percent among women who had moved to Love Canal. And urinary-tract disease had also increased 300 percent, with a great number of children being affected.

These results prompted the NYSDOH to issue a second evacuation order on February 8, 1979, for pregnant women and children under the age of two from all 660 families. As with the previous order, this too created great panic and fear among the remaining residents. Finally, on October 1, 1980, President Carter visited Niagara Falls to sign a bill authorizing funding to permanently relocate all families who wished to leave. All but 67 families moved out of the Love Canal neighborhood.

President Carter's decision, like Governor Carey's, was due partly to the public pressure generated during an election year. Love Canal Homeowners Association (LCHA) deliberately focused pressure on elected representatives to make the Love Canal crisis a campaign issue, protesting at political conventions and giving hundreds of interviews to the news media, always singling out candidates by name, and always asking for their positions on hazardous-waste issues--Love Canal specifically.

It is unfortunate that every action at Love Canal, from the first health study to the final evacuation, was taken for political reasons. Members of LCHA truly believe that if we hadn't assembled this large, strong citizen organization, we would still be living at Love Canal, with authorities still maintaining that there are no health problems. There are many reasons why the various levels of government did not want to evacuate the people in this community. These reasons include:

- The expense incurred. Together, state and federal governments spent over \$60 million on Love Canal, which was later repaid by Occidental Chemical through a government lawsuit.
- The precedent that would be set by evacuating a neighborhood because of chemical exposures. At the time, there were an estimated 30-50,000 similar sites scattered across the nation.
- The lack of peer-reviewed scientific studies. The scientific understanding of human health effects resulting from exposure to low-level chemicals had been based on adult workers exposed over a 40-hour work-week, while at Love Canal the threat was residential, involving pregnant women and children exposed to multiple chemicals 24 hours a day.

Eventually, the 239 homes closest to the canal were demolished and the southern sections of the neighborhood declared unsuitable for residential use. But in September 1988, the 200 homes in the northern section of Love Canal were declared "habitable," which should not be confused with "safe." This decision to move people back into Love Canal is an appalling idea that cannot be justified by legitimate scientific or technical data. These homes are still contaminated, as are the yards around the adjacent evacuated homes. The only separation between them and those still considered uninhabitable is a suburban street. Anyone can freely cross the street and walk through the

abandoned sections of the neighborhood. In fact, children ride their bikes and play frequently among the abandoned homes. And 20,000 tons of waste still remain in the dump.

The world is a very different place now for families who lived through the Love Canal crisis. What was once taken for granted is no longer--that if you work hard, pay your taxes, vote on election days, and teach your children right from wrong, you can achieve the American Dream. Eyes were opened to the way our democracy works--and doesn't work.

Former residents of this blue-collar community have come to see that corporate power and influence are what dictated the actions at Love Canal, not the health and welfare of citizens.

Each step in the events as they unfolded shocked and stunned the public. It was not conceivable to families that their government would lie or manipulate data and studies to protect corporate interests. It was difficult to grasp the reality--obvious, in retrospect--that corporations have more influence and rights than tax-paying citizens. This realization left us feeling alone, abandoned, and empty inside. Love Canal taught us that government will protect you from such poisoning only when you force it to.

If you think you're safe, think again. And, if you're ever in doubt about what a company is doing, or what government is telling you, talk with your neighbors, seek out the truth beyond the bland reassurances of the authorities, and don't be afraid to dig your heels in to protect your community. The number of children with cancer is increasing, as are the incidences of breast and prostate cancer in adults. Children suffer more today than ever before from birth defects, learning disabilities, attention-deficit disorders, and asthma. These diseases and adverse health problems are no longer located in someone else's backyard; they're in everyone's backyard, and in our food, water, and the air we breathe.

Over the past 20 years, the U.S. has come a long way in identifying buried wastes, cleaning up sites, reducing some air and water pollution, and cutting back on both industrial and household waste. We have cleaned up the rivers that once caught fire and removed the ugly barrels that sat in abandoned industrial sites or fields. We cleaned up what we can see--the obvious, the ugly--but there are deadly poisons invisible to the eye that remain in our everyday environment and food supply. The challenge for the next decade will be to eliminate the poisons we can't see, but that are evidenced in the state of our health, in the growing number of diseases in our society.

As we move forward to correct the pollution mistakes of the past, we are bound to uncover new information and new problems. Waste facilities like the one at Love Canal continue to be discovered--a national phenomenon that has created a flurry of communities organizing themselves to wage their own David and Goliath struggles. These urban and suburban neighborhoods and rural communities now make up the new grassroots movement for environmental justice. Their efforts are critical, but, like Love Canal, they are only first steps.

It will take a massive effort to move society from corporate domination, in which industry's rights to pollute and damage health and the environment supersede the public's right to live, work, and play in safety. This is a political fight. The science is already there, showing that people's health is at risk. To win, we will need to keep building the movement, networking with one another, planning, strategizing, and moving forward. Our children's futures, and those of their unborn children, are at stake. ●