Matt Stanelle
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Fish Contamination in the Great Lakes

Defining Problem / Research Question

There are many chemicals in the water but only at a very low concentration. Some of these chemicals can *bioaccumulate* in aquatic organisms and can become very concentrated with chemicals such as: toxaphene and PCBs. Small fish and zooplankton eat large quantities of phytoplankton. Any of the chemicals accumulated in the phytoplankton become even more concentrated in that animals that eat them. This is the same for every step in the food chain. Fish like lake trout and lake salmon can have contamination levels millions of times higher than that of the water they live in. In fact, all foods, including fish, contain environmental contaminants.

State and provincial governments provide information to consumers regarding consumption of sport-caught fish. This involves interpretation of studies of health effects from exposure to contaminants. Some effects may include numbness of fingertips, dizziness, and the sensory loss that might occur from toxic exposure to methyl mercury. It is important that people are aware of contaminants in fish and the actions that can be taken to reduce exposure, particularly those people who are at the greatest risk from overexposure to contaminants found in fish. Precise levels that can strongly affect a person may vary depending on his/her age, sex, genetics, current physical condition, and previous exposure. People are high risks are those who eat a lot of great lake fish, regularly eat large predator fish, eat fish from highly contaminated waters, or eat a large amount of fish over a short period of time. Young children and fetus' are at the greatest risk.

My Goal is to test the contamination of surrounding, conduct a survey of how many fish are caught and/or consumed in these water, and determine how the contaminants affect people or even the food chain.

Formulating a Hypothesis

I predict that in good water quality, people who eat fish occasionally will not see physical effects. Those who eat fish in poor water quality may see the effects even from not over eating contaminated fish. And those who eat fish regularly in either of these conditions may be affected by becoming sick with symptoms listed above. Each lake will vary in quality, but the amount of contaminants consumed and with the other variables added in, depending on the person, will produce similar results.

Selection of Variables

- Overall Water Quality
- Pollution regularly going into the water
- Steps taken to prevent pollution
- What Aquatic Organisms that are supported by the surrounding waters
- Overall health of Aquatic Organisms
- Levels of Various Chemicals in the Water
- The amount of fish consumed and over what period of time

Designing a method with Appropriate Apparatus / Materials

1. Gain access to materials to test water quality
2. Go online or use another resource for determining water pollution
3. Go online or use another resource for determining pollution prevention
4. Gain access to a chart of Aquatic Life in the waters
5. Gather materials needed to test for various levels of contamination
6. Gather materials need to conduct a survey of fish that are consumed from the area of water you are studying

Design a Method for the Control of Variables

1. Determine the overall water quality by testing the dissolved oxygen, fecal coliform, pH, B.O.D., Temperature, total phosphorus, nitrates, turbidity, and total solids. Then determine what condition the water is in. (poor, good, medium, high)
2. Study the contaminants going into the water (sewage, etc.).
3. Study the actions take to prevent pollution.
4. Study a chart that shows the types of Aquatic life
5. Use your materials and test the levels of various contaminants that affect fish and their consumption
6. Conduct a survey of the amount of fish pulled from the waters and consumed

Design a Method for the Collection of (raw) Data

1. Use the information you collected for the overall water quality
2. If the water quality is good, set a level of acceptable consumption and then pay close attention to those people whom consumer more than that limit. Record any physical affects primarily from the contamination
3. If the water quality is good and people eat less than the acceptable level of fish, record any physical affects primarily from the consumption of the contamination
4. If the water quality is poor, set a level of acceptable consumption and then pay close attention to those people whom consumer more than that limit. Record any physical affects primarily from the contamination
5. If the water quality is poor and people eat less than the acceptable level of fish, record any physical affects primarily from the consumption of the contamination
6. Create a chart displaying data thus showing affects from contaminates in fish.

Side Affect from Contaminates in Poor Water Quality Conditions	
THOSE WHO EAT *LESS* THAN THE ACCEPTABLE LEVEL OF CONTAMINATED FISH	**THOSE WHO EAT *MORE* THAN THE ACCEPTABLE LEVEL OF CONTAMINATED FISH**

Side Affect from Contaminates in Good Water Quality Conditions	
THOSE WHO EAT *LESS* THAN THE ACCEPTABLE LEVEL OF CONTAMINATED FISH	**THOSE WHO EAT *MORE* THAN THE ACCEPTABLE LEVEL OF CONTAMINATED FISH**