This Lake Alive!

An Interdisciplinary Handbook for Teaching and Learning about the Lake Champlain Basin

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Research and Inquiry (and Action!)

The Year 3000

by Becky Martell, Grade 5, School Street School, Milton, Vermont

It is the year 2012. A beautiful lake, Lake Champlain, is becoming polluted and full of garbage. The *Spirit of Ethan Allen* does not sail on Lake Champlain anymore because the propeller got clogged with garbage. It is in an old garage, rotting in decay. No one cares. The last ride on the *Spirit of Ethan Allen* was in 1998.

No one pays attention to what they are doing to the lake, because they all have million-dollar pools. And they are too busy partying and having a good time and throwing trash all over which ends up in the lake. There is a low population of fish and only a few people still eat fish from the lake.

No one has seen Champ since 1996. Scientists say he or she has died. That is all they said so they could go home and watch the NFL on a new channel called "Football Only."

No boats go on the lake anymore; they are all locked up like the *Spirit of Ethan Allen*.

One summer the clean water supply was low, then it was gone. No one could fill up their pools so they decided to go to the lake. When they got there they had a big surprise. The lake was full of garbage and it was sick. No one wanted to swim in that, so they went home.

As the days went by, it got hotter and hotter and there was no water. The people were getting hot and mad at each other and they were getting mad about what happened to the lake.

Then on the hottest day of the whole summer, they decided to clean it up. It took six weeks with all the people helping.

Now they had to fix the *Spirit of Ethan Allen*. After four months and two days, it was able to sail again on Lake Champlain. Champ has been seen again and Lake Champlain is still beautiful in the year 3000.

Introduction

Although not in my original plans, the need for this chapter grew as the book evolved. I found myself writing: "depending on how you structure your classroom" numerous times. I didn't want to start philosophizing every time I wrote that, but it started to make sense to write about such things in a separate place.

Learning about Lake Champlain is different from studying the pyramids of Egypt and invites new methodology. Here are some of the ways that teaching and learning could and should be different when studying a local resource.

I want to note that much of the research that I did with students was when I was teaching seventh grade in Milton Junior-Senior High School. At that time, I taught Social Studies to 110 students, in a junior high setting. Suggestions for amending research for the lower grades are included here.

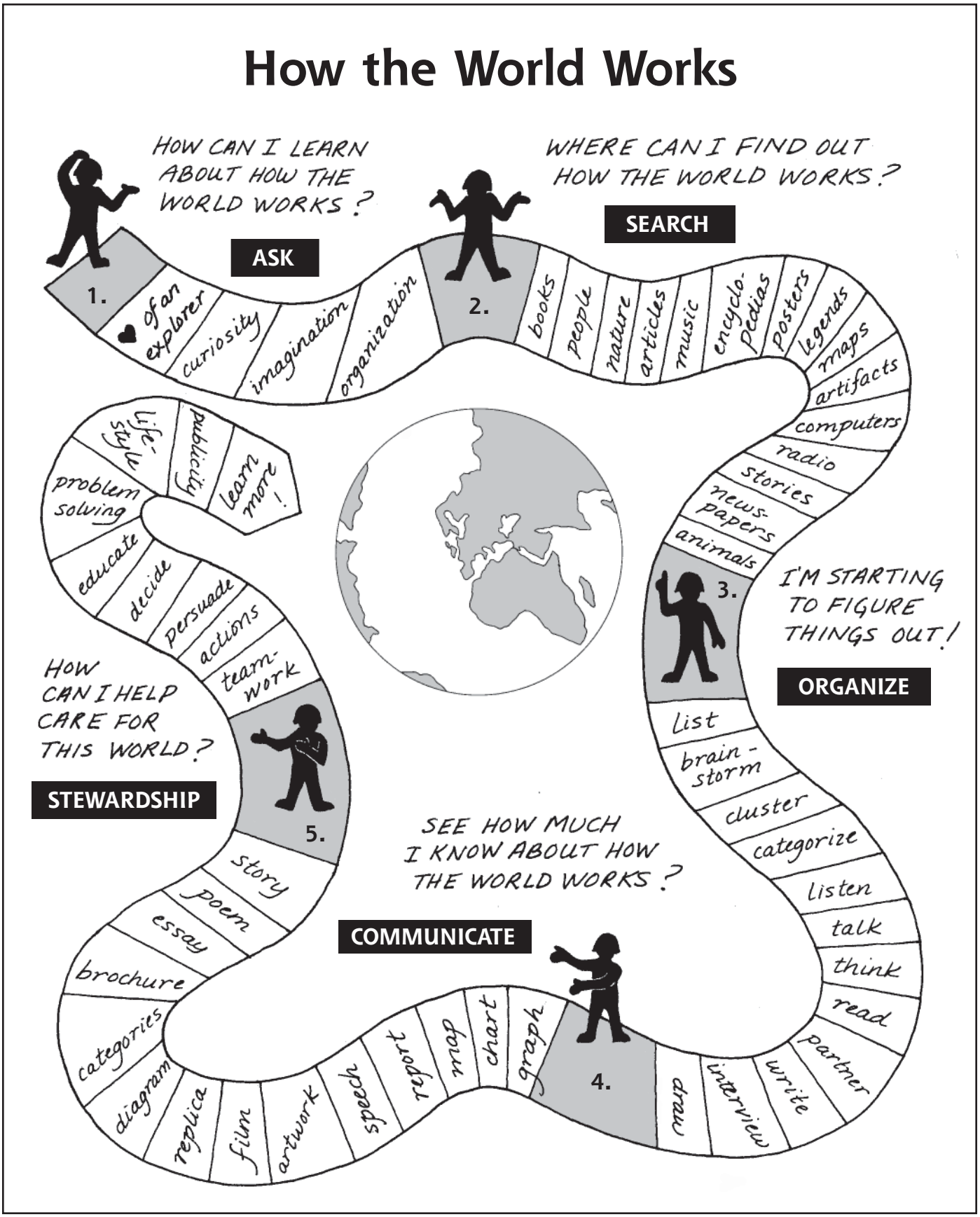
There are many excellent sources to help you do nontraditional research:

- Sometimes a Shining Moment *by Elliot Wigginton*
- My Backyard History Book *by David L. Weitzman*
- Our Town: Recording and Presenting Local History and Folklife (Teacher Handbook) *by Greg Sharrow*
- Many Cultures, One People: A Multicultural Handbook about Vermont for Teachers *edited by Greg Sharrow*
- "Legacy of the Lake" (video)—*Vermont Folklife Center*
- You Hear the Ice Talking: The Ways of People and Ice on Lake Champlain *by I. Sheldon Posen*

Also, here are three books I recommend regarding stewardship:

- Come Back Salmon *by Molly Cone*
- It's Our World, Too! *by Philip Hoose*
- Letters from the Earth *by Schim Schimmel*

How the World Works



Research and Inquiry (and Action!)

Getting students excited about learning about the lake is central to everything this book is about. Research and inquiry, whether structured or informal, is at the heart of an interdisciplinary study.

I believe our job is to help students:
- learn to ask questions about what is around them,
- identify ways that they can find answers to these questions,
- use skills of reading, observation, experimentation and dialogue to obtain answers,
- organize answers in a way that is meaningful to them,
- design a way that they can communicate what they have found.

This chapter is based on how to design classroom research that is tied into the life-long skill of self-directed learning. Whether you and your students want to do a large, ongoing research project or whether you do a short inquiry about boater safety, you are engaged in finding out how to find things out. I will outline some of the possibilities for a large research project as well as for a variety of shorter projects.

I call the large in-depth research project an "I-search." I will describe the parts of an I-search. Keep in mind that any one of its components may be set up individually as a shorter inquiry project.

This chapter will explore a "redefinition of sources" and a variety of ways that kids can learn from these resources. Unless you're in a very unique situation, turning them loose in the library is not an option. Even if your library has a good collection of local history material or freshwater science books, much of it is not fit for kid consumption. So let's think beyond books! The study of Lake Champlain is a very "happening" thing and students need to learn how to access information in new ways.

***Note**: I think the term "I-search" came from Ken Macrorie, who wrote a book titled THE I-SEARCH PAPER. I borrowed the term but do not presume to borrow any of Macrorie's ideas as I have not read his book. The main idea of an I-search is the connection between the student and the material.*

What kind of inquiry do you want to do?
Decide (with your class as much as possible) what sort of research you want to do. You may decide to devote two or three weeks to a major research project or to enhance your ecology study with some oral interviews about land development.

How much time will you devote to the research?
Many factors determine how extensive the research will be. I have had the experience of thinking we would spend a long time doing research and, for one reason or another, discovering my plans didn't "take." I have also (in general science, not with Lake Champlain studies) organized a snappy little research/reading inquiry and had the class turn it into a four-week study, including my first-ever and most wonderful science fair. Although we have a multitude of things dictating our time, sometimes it's good to "go with the flow."

Can I do this with all ages?
I am not currently doing this extended I-search project with fifth graders. Even when I did this in seventh grade, the reading level of much of the information, as well as the availability of much of the material, was a constant challenge. That doesn't mean it isn't possible. I made up three-ring binders and folders on various topics. I collected newspaper articles, flyers, newsletters, maps and diagrams—I scrounged! I also collected a lot of books and pamphlets, some of which are unfortunately out of print. But that was in the "old days" of lake studies and you now have available to you a number of other resources that you can collect for your classroom. I had to steer some kids to topics that they could handle, like fishing and species of fish, geography and Native American artifacts. Other students got carried away with underwater archeology, biographies, ecological issues and life at Crown Point.

What is it?
The "pieces" of an extensive research project are outlined below. They can also be used separately for shorter inquiries.

The I-search project includes:
1. setting clear expectations,
2. choosing a topic,
3. investigating sources,
4. using people as sources,
5. keeping in touch,
6. finding out about current research.

SETTING CLEAR EXPECTATIONS

Before you officially begin your I-search, discuss with your students the main parts of the project. Depending on how you run your room, you may or may not have this worked out ahead of time. Usually, I "cheat." I have a pretty good idea of what I'm hoping to do, run it by them and hope they buy it. Sometimes they don't, as I mentioned before, and it's worth adjusting your plans if they don't. But if they do, and hopefully you've created enough build-up so they will, work out with the class the pieces of the research. For example, I find it a lot easier to discuss how long a paper they think they can write and reach a consensus than to say "I will require a 10-page report." Communicate your expectations. You may have in mind a three-page minimum. They might lobby for two; that's when you make really clear that, in your opinion, you can't successfully communicate enough information in two pages and if they are really going to put a lot of time into this, they need to proceed with higher expectations.

"The most interesting thing about my I-search is that I'm working with friends and we're doing a play."

thinkbook entry, Grade 7, Milton

It is also important to discuss what work you expect students to do on their own and what work might be done collectively. I remember that I originally introduced the non-written project as an individual project. My students quickly communicated that they really wanted the option of doing their projects together. Being able to present together, even if they had made projects separately, was also important.

It's a question of balancing your standards as a teacher and the need as a human being to be responsive to the other 20-plus human beings that you are working with. In our profession, it's an issue we face all the time and it's important for each teacher to figure out her philosophy in this regard.

When we have finished our discussion, I write on the board the agreements that we have made. I will type this up and hand it out the next day. It's a good idea to send it home for a parent signature since parents can be a significant source of support.

Consider the power that their full agreement has brought to the research compared to handing them a worksheet with the decisions all made!

The handout might look something like this (see next page):

Lake Champlain I-Search

The I-Search has three main parts:

1. Research Paper

- Each student writes his or her own paper, three-to-five pages.
- Includes the following: introduction
  information
  sources
  conclusion

Rough draft due: _____

Final draft due: _____

2. Non-Written Project

- Students may work in groups.
- The student-designed creation should illustrate some aspect of the student's research.
- It can be a map, diagram, model, skit or play, timeline, video, collage, poster, or ....

Projects must be completed by _____

3. Presentation

- Students may present together.
- Each student will present his or her research and project to the class.

Presentations will be given _____

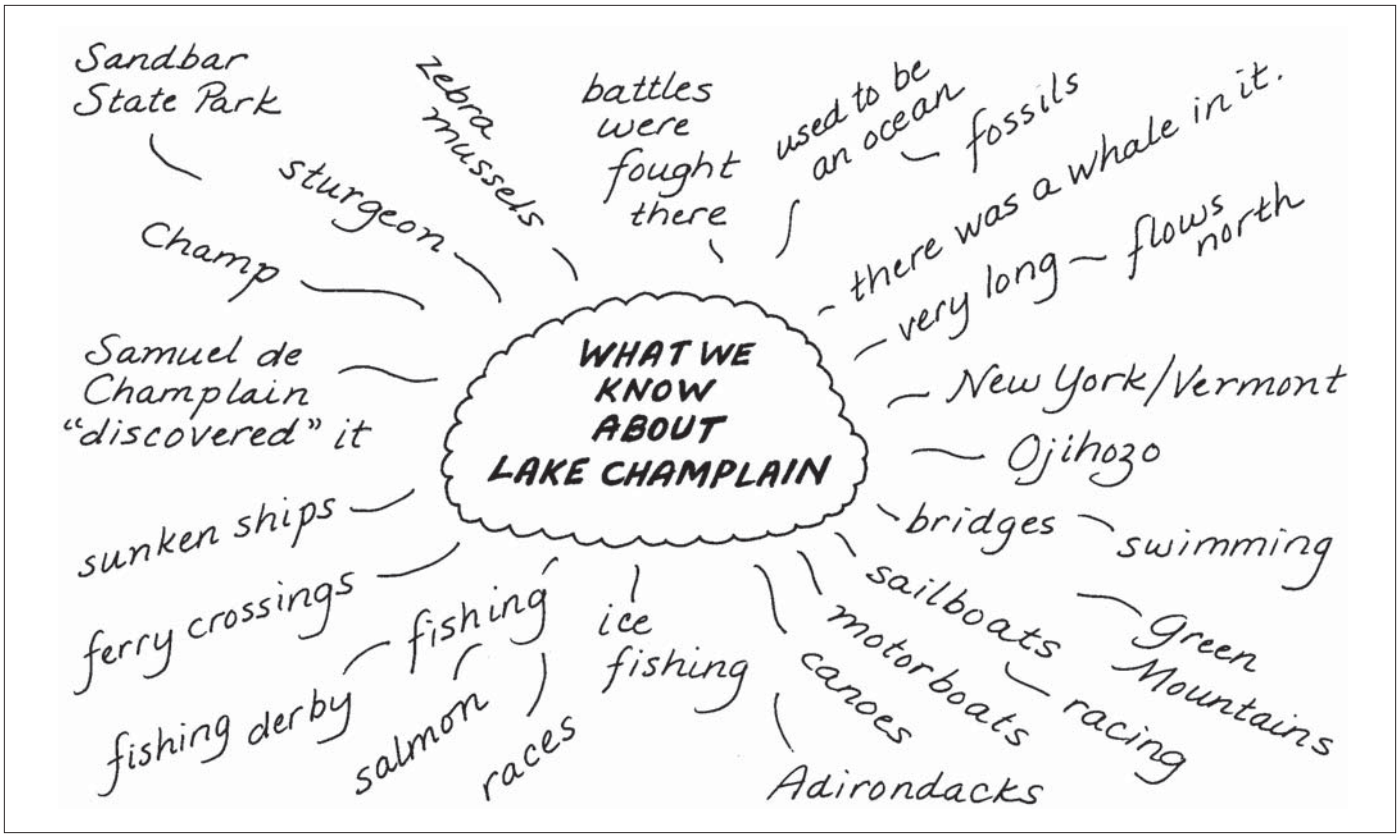
The grade for the I-Search will be based on the completion of all parts described above, as well as on the ability to be on time and on task with daily responsibilities.

CHOOSING A TOPIC

The most critical part of the process is choosing a topic. It is also the most difficult. Students don't always make up their minds, how and when you want them to. I believe firmly that, in this kind of inquiry, it is their job to decide what they want to learn about; I am here to help. Allow plenty of time for this process and find different ways to keep in touch with what they are thinking. When I have a special-needs student who does much of the class work with a paraprofessional, I try to alert both student and helper that this is coming up so that they can get a jump on the process. Many children have difficulty taking this first step. As often as I can, I try to have an early conversation with a student, if his or her interest was piqued by a guest speaker or field trip. Strike while the iron is hot!

Explore topics with cluster

Brainstorm all the possibilities for topics in a cluster. Post the cluster in the room and add topics as they come up. Students can also use this as a way to sign up for their topics. It is important for them to be familiar with each other's topics, so they can share information as they proceed in their research.



Keep in mind available resources as students make their choices, but don't underestimate the detective skills of middle-level students when they get going. I had one student my second year who was bound and determined to study toxins in fish. At the time, I knew next to nothing about it and had few resources to offer. I think he ended up making use of the Lake Champlain Committee and their newsletters and the local game warden. He was very proud of his final work.

When the student has ownership of and a vested interest in the topic, the results multiply. Much of the success of this kind of inquiry rests on students' knowing the reason for the inquiry and wanting to go digging. They may have a reason for choosing a topic that you don't understand, but that is very clear to them.

When a seventh grader chose to research "Champ's Chips," I must admit I had doubts about the worth of the project. "Potato chips?" I asked myself. Her final project was outstanding. She arranged a trip to the factory and observed the process and workings of the technology necessary to make potato chips. She conducted interviews and conducted a taste preference survey. Her paper and accompanying diagrams outlined the process and her classmates were enthralled. When she wrote in her thinkbook, she explained the potato chip to Samuel de Champlain! She was an expert on potato chips and proud of it. Heaven forbid if she had listened to her teacher!

"For me, a project like the I-search, where you turn kids loose, is the scariest and most rewarding. There were moments when I saw kids floundering and I'd yearn for a set of worksheets I could hand them to ease the worry. Some kids don't do well with self-directed projects. But others sail. And some soar.

An incredible spirit grew as the kids got a handle on their topics. The choices were amazing. Lots on Native Americans, battleships and diving for sunken ships, maps, fishing, islands, pollution.....One kid chose to research the Sandbar State Park and found out there was a toll bridge where pigs and other livestock were led across the causeway to the Islands to graze. Now I probably wouldn't have chosen that to teach...but it was an incredible presentation. And what a great thing for them to know about as they play at the park next summer!

I really believe that they learned more from each other in one week of presentations than they did from us in the previous three weeks. One kid said on Friday that it's because 'the kid speaks your language and it's things you're interested in.'

Another reason I felt good about the projects is that I was able to keep in touch with their planning through thinkbooks and the structure of research time."

ABD Teaching Journal

Self-directed research requires the ♥ of an explorer, wanting to go looking and seeing and learning in different ways. I think it is necessary to talk about this directly and not hope that it happens. Encourage your students to go digging. Shout a loud hurrah when they do. How you model that in your room is critical to the integrity of this kind of work. I know that my "crazed passion" for learning about Lake Champlain had a lot to do with the success of my students' research. You can't sign up for that, but hopefully you will be teaching about it for a reason that you, yourself, believe in.

When students have chosen their topics, it is important for them to communicate with you early on in the process. (See "Keeping in Touch," p. 312-315.)

INVESTIGATING SOURCES

What is a Source?
Brainstorm with your class "What is a source?" Encourage them to think of how they get information and from where:

- people
- television
- newspapers
- artifacts
- photographs
- artwork
- telephone
- encyclopedia
- nonfiction books
- fiction books
- atlas
- computers: data base, internet, CD-ROM

Brainstorm what you have to do to get information from these sources. What sources do they feel the most confident about? Which ones will they need some help using?

OR

You can use a source brainstorm as a way to have students start to think about topics for a major research project, or a shorter inquiry.

- What are students interested in?
- What kinds of things might they like to find out?
- What kinds of skills are necessary to find information from different sources?

There are a number of organizations that publish information. As adults we use agencies as sources all the time. Many agencies have charts, graphs and maps that are difficult to decipher. It makes sense to me to bring these "real" sources into the classroom and practice using them.

For example, interpret a Fish and Wildlife Department fact sheet on muskrats or a diagram on the water cycle from the Agency of Natural Resources. Sometimes this can be done informally by just having students review

material together. It can also be done as a reading comprehension assignment with a teacher-designed worksheet.

When you are doing research, you may choose to make a requirement that expands a student's use of sources. I require that one source be a person. Bill Romond, at Colchester High School, requires that his students use the telephone to acquire information. I think we often equate research with the printed word. Formalizing the use of different sources helps the teacher and the student!

Source Search

I mentioned earlier that much of the information available about Lake Champlain is difficult for students to read. A "source search" can be used to get students familiar with the resources that are available and expand their choices for topics. It will also help students feel more comfortable with the sources, since many of them are "grown-up" books.

Assemble as many books as you can about Lake Champlain. (See "Get the Picture" in *Getting Wet*, p. 13.) After you have spent some time enjoying and sharing the information, explain the source search. You may choose to pick one book and do a source search together on the overhead.

After all students understand the source search, I usually let them complete one at their own pace, perhaps during reading time or study hall. This is helpful because several students may want to complete a source search on the same book and this way they can take turns. Set a due date for all source search papers to be complete.

Source Search

Write down three things you learned from looking at this book.

1._____

2._____

3._____

Write down one thing that you learned from a picture in this book.
Explain what you observed in a short paragraph.

_____

_____

_____

_____

Write down one interesting fact that you found in this book.

_____

_____

Write a note to your classmates about how you think this book might be helpful to them.
Try to be specific. Your "review" will be posted.

_____

_____

_____

_____

Use the back side to make a sketch of something that you learned from looking at this book.

USING PEOPLE AS SOURCES

The lake provides a rich opportunity to interview people about their experiences. Students need a lot of preparation to do successful interviews. On the other hand, talking about the past is a natural human activity. No matter how involved you get teaching the interview process, be sure to include interviews in your local study.

How to use a person as a resource
Interviewing is a skill for students to learn. It can be incorporated into a larger research project, as one of several ways to get information, or it can be an inquiry project of its own. In either case, the interviewing skill needs practice.

Sometimes the simplicity of children learning to talk to and learn from adults (and vice versa) makes an oral history project worthwhile all by itself, even if they don't find out anything about Lake Champlain! Here are a few tips:

1. Educate your class about people as sources. You can do this by reading journals, oral histories, old and new newspapers or by bringing a volunteer to talk to your class about a topic of interest. An interview is not just an assignment for class. It's an important life skill that involves:
- sharing history,
- preserving history,
- collecting stories,
- learning about your neighborhood,
- learning to talk to people,
- sharing and hearing opinions.

2. Give students time to prepare questions (and get feedback) and time to practice asking questions. They can practice on each other and if you have time, they can "warmup" by going through the whole process (preparing questions, practicing, interviewing, write-up, and final draft) using each other as sources. Each student can choose something he or she would like to be interviewed about.

3. Coach students on designing questions that:
- make the interviewee feel comfortable,
- establish the basic facts about the person and the topic,
- dig more deeply for information,
- clarify or rephrase.

People who:
- ice fish
- work on ferries
- make duck decoys
- dive
- make canoes
- go boating
- go duck hunting
- observe birds
- shoot pickerel
- found artifacts
- smuggled during prohibition
- saw Champ
- conduct scientific research
- can carve
- can sail
- worked on an old ferry
- danced on S.S. *Ticonderoga*

Devote some class time to practicing follow-up questions.

4. Help your students find sources. Find a few people (maybe who work in your building) who will be available for interviews for the few students who will have a hard time finding a neighbor or relative—or who are unable to structure the time to interview someone.

Choosing a topic for your interview

The scope of topics to interview people about is broad. Start a list with your students of possible topics. If you post the list in the classroom, you and your students can post names and addresses of people who are willing to be interviewed.

You can also base a class-wide inquiry, where all students pursue the same topic but interview different people, on some general categories such as:

- Find someone who remembers a cold winter on or near Lake Champlain.
- Find someone who is doing research on or near Lake Champlain.
- Find someone who has an opinion about....

OR

Base your inquiry on general questions:

- What does the lake mean to you?
- What do you remember about the lake from when you were young?

"The interview is perhaps the hardest thing in the unit. But I never doubt its worth. Some students feel discouraged that they'll never find anyone. I tell them that perhaps they could find a student in school that has done a lot of fishing.

I knew things were picking up when Laurie J. asked me if it would be all right if she interviewed her grandmother who used to go to dances on the ***Ticonderoga*** *when it was still afloat. Could she! I exclaimed. What a wonderful idea.*

Many kids found out that their parents knew more about the lake than they thought —'and that it was really fun to ask Dad questions.'

Mrs. Fitzgerald, an aide at school, took three kids to interview her father, Mr. Manley, who has an extensive arrowhead collection. That was a treat for the kids who went, and, I suspect, for Mr. Manley.

Mrs. Fitzgerald, a member of the Milton Historical Society, also uncovered other interviewees, one of whom fished for his food and livelihood during the Depression."

ABD Teaching Journal

Interview Tips

Before your interview:

1. Make an appointment.
2. Explain the purpose of the interview.
3. Agree on a mutually convenient time and place.
4. Arrange your transportation ahead of time.

Be prepared:

1. Bring your questions and an extra pen or pencil.
2. Group your questions so the interview makes sense.
3. Write out your questions and leave space for answers. Practice!
4. Bring a tape recorder (optional). (You will need permission to tape.)

At the interview:

1. Introduce yourself.
2. Make the interviewee feel comfortable.
3. Find ways to get longer, more detailed answers.
4. Follow an interesting topic—even if it wasn't one of your questions.
5. Have the interviewee sign a statement allowing you to use information in your final paper or project.
6. Thank the person for his or her time and help.

After the interview:

1. Take time to go over your notes and fill in any gaps.
2. Go somewhere quiet where you can write up the main part of your interview.
3. If you missed something important you may need to call up your source.
4. Send a thank you note—and follow-up questions if necessary.

Your interview write-up should include the following:

1. The person's name, and the date and location of the interview.
2. Information that you learned.
3. What you found most interesting.
4. Additional information of your choice.

KEEPING IN TOUCH

When students have chosen their topics, it is important for you to know that they have a clear understanding of the topic and the beginnings of a plan. This is especially true in a long-term research project, but also true in a shorter inquiry.

During the early stages of research, it is important to check in with each student and see how each is doing. This can be done informally, through class discussion, thinkbook entries and individual conferences, but another way to assess uniformly where each person is at is to have "checkpoints."

Students should know ahead of time when these "checkpoints" will be. The first one should be done early enough that you can still "save" a student who is floundering. Don't be upset with yourself if you didn't anticipate this problem. Sometimes floundering is good! But it is to help the occasional flounderer that you need these pre-established check points. It may be a case of:

"*I know you want to research the General Butler but we've been working for two weeks now. You have four days to see if you have adequate information. When we do our "Fact Finding and Communication" on Friday you'll have to be able to show me you are all set or you will have to change topics.*"

Fact Finding and Communication

Write 10 facts that you have learned from your research.

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

In the space below and on the reverse side, write a well-organized paragraph using at least one fact from your research. You may use more, but remember, the point is to explain what you learned in your own words. When you are done, underline the parts (facts) that you borrowed. Try a rough draft on a separate piece of paper first. _____

_____

_____

WHEN STUDENTS NEED MORE DIRECTION

As already mentioned, self-directed research is not for everyone. Some students have a very hard time. Maureen Saunders, when working in my classroom as a Chapter One paraprofessional, demonstrated a particular knack for directing students who were floundering. It takes a graceful touch, because you don't want to take away the student's choice. However, it is important to step in when you are needed. How do you know when a student needs you to sit by her side and say, "Here, how about doing this?"

Stepping in does not mean deserting your open inquiry goals. Some students can't handle too much exploration and need the safe confines of teacher direction. Maureen had some ready-made possibilities that the student could choose from. Within the confines of the discussion with the teacher, the student had many opportunities to choose.

> *"Your topic is ferry crossings; let's look at your plan. What is one thing you have learned about the ferries? You've learned that there are three crossings? Okay, let's write a paragraph about each crossing here. Is there one ferryboat that you learned about? Okay, let's write about that here."*

Examples of topics:

• **Geography:** Make a map and locate shipwrecks, or historic sites or ferry crossings.

• **Fish:** Research different kinds of fish and make a poster of five fish with captions. Add a diagram of a fish and label the parts.

• **Zebra mussels:** Research and make a poster with five facts and a diagram of the life cycle of the zebra mussel.

• **Wetlands:** Write about five important things that wetlands do; draw a picture and make a wetlands tape of wet, mucky noises.

When discussion centered around the structure of a research paper, Maureen had in mind some ways to structure the paper so it didn't seem so huge. In a writing conference, she sat down and outlined the parts of the paper, then the student had smaller spaces to fill in.

It is important for us to remember what a momentous thing it is to make a choice and commit yourself to creating something. An important aspect of our job is to facilitate this process whenever possible and make it a safe and successful experience for every student.

Research Plan

Topic: _____

Define your topic in a well-organized paragraph. You should have a focus.

Think about the things you want to learn and communicate.

_____

_____

_____

_____

Identify at least three sources (title and author, name of person and address, etc.)

1. _____
2. _____
3. _____
4. _____

Do you have any questions about topic or process? _____

_____

_____

What are you planning to do for your presentation? _____

_____

_____

What do you want to teach the class about your topic? _____

_____

_____

DOING RESEARCH WITH STUDENTS IN LOWER GRADES

Doing self-directed research with students in lower grades is more of a challenge when many of the sources are hard to interpret. Still, it is worthwhile.

There are many ways to structure research to make it a successful experience for all of your students. Cooperative groups, a limited choice of topics, smaller research projects and different levels of projects help. An example of a "mini-research" project is a well-defined science paper for fifth-graders with a choice of three topics and outlines for each topic.

Science Paper

Possible Topics

A FISH

1. Pick a fish.
2. Identify characteristics (size, color, weight).
3. Identify habitat, life cycle.
4. Find other interesting information.

AN ENVIRONMENTAL ISSUE

1. Identify issue or problem.
2. Identify cause or problem.
3. Suggest possible solutions.

THE LAKE AS AN ECOSYSTEM

1. Identify topic.
2. Include meaning of important science vocabulary.
3. Give an example.

FINDING OUT ABOUT CURRENT RESEARCH

An amazing amount of data is currently being collected about Lake Champlain. Millions of dollars are spent on scientists, data collecting, and equipment. When I ponder in 1995 what wasn't known about the lake in 1985, it is staggering. What resources will children have in 2005 as they learn about this precious resource?

One thing is for certain, somehow attaching your study to other studies in the basin gives your students a sense of community with other learners and an awareness that science and inquiry are alive!

River Watch and other citizen monitoring programs use data collected by students, another excellent way to get students involved in their area. Colchester High School students conduct water sampling in Mallett's Bay and do research that must be shared with the community when completed.

Here are some ways to connect your students to some of the ongoing research and activities in the Lake Champlain Basin:

Classroom Activities

• Bring in guest speakers who will share their research (sometimes graduate students have more time).
• Bring in guest speakers and encourage connections with people in your community that are involved with environmental action.
• Conduct an oral interview with a scientist or river monitor.
• Find a way to update some data on an "old" flyer.
• Offer telecommunications opportunities. Mountain Lake Broadcasting arranges on-line telecommunications with schools and researchers. Students can use the Internet to research up-to-date data on the lake and communicate with other learners.
• Read up-to-date newsletters and brochures such as those currently published by the Lake Champlain Committee, the Lake Champlain Basin Program, the Lake Champlain Maritime Museum, and state Fish and Wildlife agencies.

Field Trips

• Visit the *Melosira,* the University of Vermont's research vessel.
• Visit the Lake Champlain Basin Science Center.
• Visit laboratories that are conducting research such as Miner Institute in Chazy, New York, or the School of Natural Resources at UVM, in Burlington.

Going to the Lab

by Bachir Yahi, Grade 6, Frederick H. Tuttle School, South Burlington, Vermont

Bachir Yahi, Brian Costello, Joe Leonard, and Andy Griggs went to the State Health Department Laboratory to test the water from Potash Brook. We met Senior Chemist Carla White who gave us a tour of the facilities.

During the tour we tested the water that we had brought from Potash Brook. We first tested for turbidity. Turbidity is the test for visible solids, for example, if the turbidity is high, the water is cloudy.

After that we tested for pH. The pH is how acid or basic the water is. For example a pH of 7 is neutral while 14 is very basic and 1 is very acidic. We also tested for things like alkalinity and sodium.

To test for sodium we put the water through a pump that sprayed it into a very, very hot fire! If it turned white the sodium was high. If you have high sodium, the water will taste foul.

We also learned that the State Lab tests for AIDS and tuberculosis. They keep the tuberculosis in a "hood" that keeps the bad stuff out of the air. They also test for rabies, so they get dead animals to test. The way that they test for rabies is to smash the animal's heads open to test. They call the room the bat cave because once a bat that people thought was dead started to fly around the room!

In conclusion, the State Lab is an interesting place to visit.

Mentors/Lake Heroes

Perhaps one of the most important things you can do is bring them in touch with people who are working to preserve the lake. Guest speakers who share their knowledge always inspire students to learn more about the lake. Lori Fisher, head of the Lake Champlain Committee, is one of the lake's heroes and students can meet her in "Champ's Chat with Lori Fisher." Below, she shares her vision for Lake Champlain.

"Not a day goes by that I am not moved by Lake Champlain's beauty and power and fragility. We are less than half a decade shy of a new millennium. Many of the people in this room will live out half their lives in the new century. In our actions today, we need to ensure that the Lake Champlain of 2000 and beyond is a lake with edible fish, and drinkable, swimmable waters. That people will have access to the lake without having to own shoreland property. That when residents and visitors look to the shoreland from the lake the view will still be dominated by swaths of sand, rocky precipices, floodplain forests, fertile pastures, and stands of cattails and wild rice. That the children of tomorrow will still have the opportunity to see and be moved by the lake's unique and wild places—to see the snow geese lifting from Dead Creek in the fall and great blue heron fledglings learning to fly at the rookery on Shad Island. That they will be able to stroll along the waterfronts in Plattsburgh, Port Henry and Burlington and find that the built landscape embraces and reinforces Lake Champlain's culture, history and economic and environmental vitality."

Lori Fisher, closing statement
to Lake Champlain Committee,
Annual Meeting, 1996

Champ's Chat with Lori Fisher

Champ: Hi Lori! I've heard that you are a great resource. Mind if I ask you a few questions?
Lori Fisher: It's my pleasure to be interviewed by a lake creature.

Champ: You know, I'm concerned about the lake. I've lived there my whole (very long) life. How do you think our lake is doing?
Lori Fisher: Well, Lake Champlain is aging faster than it should. All lakes go through a natural aging process called eutrophication. Over hundreds of thousands of years, lakes slowly change from cold and clear water to green, swampy, and warm water and eventually fill in with marshland and become solid land.

Champ: Yikes! What will happen to me?
Lori Fisher: Well, you won't have to worry about that for a very long time, but there is a problem. Because of the things that humans do, the lake is aging faster than it should. Runoff from farms and parking lots, sewage treatment discharges, and erosion made worse by development all add more nutrients to the lake than it needs. That's why we see more algal blooms. It makes the water less healthy for aquatic creatures like you! Lake Champlain is a beautiful lake but it's not as healthy as it should be and it will be in serious trouble if we don't take care of it.

Champ: Is that what the Lake Champlain Committee is doing, trying to take care of the lake?
Lori Fisher: That's exactly what we're doing. We began in 1963 and have worked for over three decades for a clean Lake Champlain. We prevented a nuclear power plant from being built near Charlotte, Vermont, led the lake-wide effort to ban phosphate detergents, and helped pass a law that prevents boats from dumping sewage into the lake. We've been involved in numerous educational efforts that help make people aware of how their actions affect the lake.

Champ: That's great! I remember talk about a nuclear power plant. That really scared me. How did you become involved in the Lake Champlain Committee? What is your job?
Lori Fisher: I started working at the Lake Champlain Committee when I was a college student at the University of Vermont. I fell in love with the lake. I used to study on its shore and swim in it often. I wanted to do something to help it. My job as executive director means that I'm responsible for managing the day-to-day operations and carrying out the policies set by the board of directors. I'm involved with drafting legislation and water-quality policy to help clean up the lake, and arranging educational programs. I want people to understand how the lake functions.

Champ: That's a very important job. Are young people involved in the things that the Lake Champlain Committee does?
Lori Fisher: They can be; we welcome help from everyone. Young people can volunteer time at the office. In the field, we've had students stencil storm drains to prevent people from dumping waste oil into them, kids have put in plants along stream banks to lessen erosion, and they have helped clean litter and debris off the beaches. There's so much work to be done! Kids taught their parents to recycle; I think they can get their parents involved in the clean-up of Lake Champlain.

Champ: What are some important things young people should know?
Lori Fisher: They need to know that what they do in their lives will affect the lake. We use the lake every day; most of the people who live in the Lake Champlain Basin get their drinking water from the lake. When we flush the toilet, our wastes go through a septic system or a wastewater treatment facility before being discharged back into the lake; when we drive a car some of the pollutants that come out of the tailpipe end up in the lake. Young people, and adults, need to know how their actions affect our lake.

Champ: Next time a young person asks, "How can I help?" what should I tell them?
Lori Fisher: You can tell them that they can help clean up the lake by limiting their own family's impact on water quality. A few quick tips include: buy or make nontoxic household cleaning alternatives, avoid spreading pesticides on your lawn and garden, dispose of pet waste in a landfill or toilet, and walk, bike or take the bus when traveling short distances. Don't waste water. Although Lake Champlain contains about 6.8 trillion gallons of water, the more we use, the more we need to pump and treat with chemicals.

If they want to do more, they can volunteer for the Lake Champlain Committee or a local action group or write a letter to a government official stating concern about the lake's health. They can do research in their town to find out about local water issues and what political decisions affect the health of the lake. The more kids learn, the easier it becomes to participate in important decisions. If everyone does a few things to improve water quality, we'll be able to clean up the lake!

Champ: Thanks, Lori! Keep up the good work! The lake is lucky to have people like you who really care.