Learning & Leading With

Technology

Wondering, Wiggling, and Weaving

A New Model for Project- and Community-Based Learning on the Web

MATHEMATICS IN THE REAL WORLD!

## AUTHENTIC ASSESSMENT IN PHYSICAL EDUCATION

I LOST MY TOOTH!

PLANNING REAL-WORLD FIELD TRIPS

ISTE

INTERNATIONAL SOCIETY FOR TECHNOLOGY IN EDUCATION

Wondering, Wiggling, and Weaving
A New Model for Project- and Community-Based Learning on the Web

Wondering, wiggling, and weaving are three progressions of an eight-phase learning model that teaches students to connect their personal thoughts and ideas about their world with genuine research and action. The author uses the issue of homelessness as an example of a local problem that a student can research and act upon; the project outline at the end of the article suggests resources that students can use regardless of the subject they are investigating.

the **8 Ws**

By Annette Lamb, Nancy Smith, and Larry Johnson
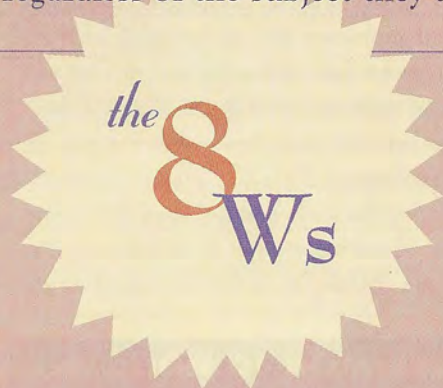
Project-based learning blends traditional subject-matter goals and objectives with authentic learning environments. Social issues in their schools, their communities, and the world provide students with excellent project topics that require them to explore information, identify issues and problems, and apply information-processing skills to the development of a meaningful project. A project-based learning environment involves wondering about a social issue, wiggling through information, and weaving elements together. How do you develop learner-centered, information-rich, problem-based projects?

Many researchers have studied the ways in which students develop projects, and they have developed many information-processing models. You can explore process models at Washington Library Media Association Online (http://www.sos.net/home/wlma/prmodels.htm).

When we observed students who were using the Internet as a resource for project development, we noticed that the most successful learning experiences were those in which the teacher acted as a facilitator, paying careful attention to students and guiding them through critical stages of their projects. We also found that many teachers were not just using the Internet to provide their students with information access; they were also using the Internet to teach search strategies, critical evaluation, decision making, problem solving, and communication skills.

As we examined popular teaching strategies and student thinking, key phases of a new information-processing model emerged. Because we find that teachers and students both enjoy easy-to-remember models, we created a new "8 Ws" approach focusing on the process of project development. The 8 Ws are:

+ *Watching,* which requires students to become observers of their environment. During this stage, students must become more in tune to the world around them, from family needs to global concerns.
+ *Wondering,* which focuses on the exploration of ideas. Brainstorming, discussing, and reflecting on questions, concerns, and ideas are all part of the wondering phase.
+ *Webbing,* the phase in which students begin locating information and connecting ideas. One piece of information may lead to new questions and areas of interest. Students select those resources that are relevant and organize them into meaningful clusters.
+ *Wiggling,* often the toughest phase for students. They're often uncertain about what they've found and where they're going with a project. Wiggling involves twisting and turning information to look for clues, ideas, and perspectives.
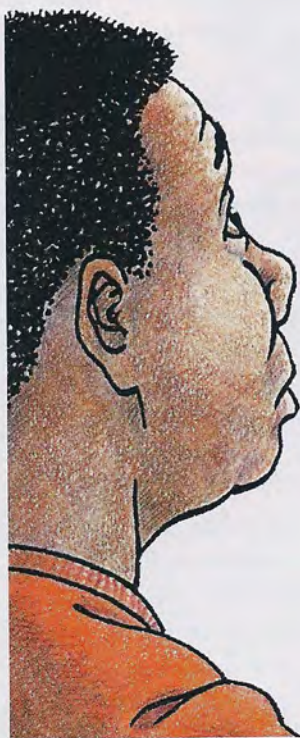+ *Weaving,* which requires the highest levels of thinking. This stage focuses on the application and synthesis of information. Students begin to originate new ideas, create models, and formulate plans.
+ *Wrapping* involves packaging the ideas, solutions, and communications. Students should ask themselves the following questions: Why is this topic important? Who needs to know about it? How can I effectively communicate my ideas to others?
+ *Waving* is the publishing aspect of the project. Students share their ideas, try out new approaches, and ask for feedback.
+ *Wishing* is the reflection point in the project. Students begin thinking about how the project went and consider possibilities for the future.

The project outline entitled "Using the 8 Ws," which begins on page 12, provides some activities and worksheets you can use to help students begin to understand this information-processing model, and at each stage of the process, to help students turn information into knowledge, share that knowledge, and learn from the experience. The following sections discuss each of the 8 Ws and how they can help students with in-depth investigations of social issues such as AIDS, physical and emotional abuse, pregnancy, and home-lessness.

INTERNET RESEARCH TOOLS

Watching

Watching requires students to become observers of their environments. The watching phase of information exploration requires students to become more in tune to the world around them, from family needs and local issues to global concerns.

Before students begin any project, they need to observe. You can lead them in developing a project about local social issues by asking questions like these:

+ When you go to and from school, what do you notice? What about when you go shopping with your family or when you spend time with your friends?
+ What stands out when you watch the local news? What about when you read the newspaper?

Students can keep journals in which they answer these questions. Then they can share and discuss sections of their journals. Once they have mastered the art of observation, they are ready to narrow their focus to a particular topic.

Wondering

Wondering focuses on the exploration of ideas. Brainstorming, discussing, and reflecting on questions, concerns, and ideas are all part of the wondering phase. The challenge of the wondering phase is that it requires keeping an open mind. Students need to explore all the possibilities before focusing on a specific topic or issue. As students narrow their topics, help them focus on particular issues, concerns, problems, or questions related to the topic. Don't let them get bogged down with "the topic." Instead, help them focus on ideas and perspectives they'd like

to explore. Students can use their journals as starting points. They could reread their journal entries and look for ideas that interest them and that they'd like to explore in depth. For example, one topic that might come up during brainstorming sessions is homelessness. To help students narrow the focus of a topic this broad, you can ask them questions such as the following:

* When have you seen homeless people?
* In what areas of town do you see them?
* What do they look like?
* Are they mostly adults? Mostly children?

Webbing

Webbing helps students to begin locating information and connecting ideas. One piece of information leads to new questions and areas of interest. Students should learn to select resources that are relevant and organize them into meaningful clusters.

Students should use a variety of information resources. General resources such as dictionaries and encyclopedias can provide useful background information. Internet search tools can also be a good place to start (see the list of "Internet Research Tools"). In addition, some Web sites, such as the Gallup Poll site, provide statistical information. Nonfiction books and videos can provide more specific information. Treat all forms of communication equally. Consider different forms of communication, such as words, pictures, motion images, and sounds. Try seeking information from audio sources, computer software, laserdiscs, reference materials, books, Internet resources, magazines, newspapers, photographs, charts, graphs, tables, maps and globes, real objects and situations, videos and movies, and interviews.

To research homelessness, students can begin by using Internet search engines and contacting local homeless services. Have them use the resources shown in the list of "Resources for the Investigation of Homelessness, Hunger, and Poverty." Af-

RESOURCES FOR THE INVESTIGATION OF HOMELESSNESS, HUNGER, AND POVERTY

Surf Starters

Homeless Profiles .... http://www.intac.com/~jdeck/profiles.html

Coalition for Homelessness http://www2.ari.net/home/nch

54 Ways to Help the Homeless http://ecosys.drdr.virginia.edu/ways/54.html

One Family's Path to Homelessness http://nch.ari.net/sjoblom1.html

National Center for Children in Poverty http://cpmcnet.columbia.edu:80/dept/nccp

Other Information Sources

Burt, M. R. (1989). *America's homeless: Numbers, characteristics, and programs that serve them.* Washington, DC: Urban Institute Press.

Feury, J. (Producer), Justice, M. (Producer), & Grant, L. (Director). (1987). *Down and out in America* [Videotape]. Oak Forest, IL: MPI Home Video.

Greenberg, K. E. (1992). *Erik Is homeless.* Minneapolis, MN: Lerner.

Hyde, M. O. (1989). *The homeless: Profiling the problem.* Hillside, NJ: Enslow.

Kenyon, T. L. (1991). *What can you do the help the homeless?* New York: Simon & Schuster.

Kozol, J. (1988). *Rachel and her children: Homeless families in America.* New York: Crown Publishers.

O'Connor, K. (1989). *Homeless children.* San Diego, CA: Lucent Books.

Resener, C. R. (1988). *Crisis in the streets.* Nashville, TN: Broadman Press.

Stavsky, L. (1992). *The place I call home: Voices and faces of homeless teens.* New York: Shapolsky Publishers.

INFORMATION EVALUATION TOOLS

BlueWeb Evaluation Rubric .... http://www.kn.pacbell.com/wired/bluewebn/rubric.html

Critical Evaluation Surveys .... http://www.capecod.net/schrockguide/eval.htm

Critical Thinking and Internet Resources .... http://www.mcrel.org/connect/plus/critical.html

CyberGuides .... http://www.cyberbee.com/guides.html

Teaching Critical Evaluation .... http://www.science.widener.edu/~withers/webeval.htm

Thinking Critically about the Web .... http://www.capecod.net/schrockguide/critical.htm

ter gathering preliminary information, they can watch documentaries about the homeless and interview local legislators, activists, and homeless people.

Wiggling

Wiggling is often the toughest phase for students. They're often uncertain about what they've found and where they're going with a project. In the wiggling phase, students look for clues, ideas, and perspectives. By working in small groups on a collaborative project, they can turn to each other for support. However, if students work independently, they may need the support of friends, family members, and teachers. Encourage students to use online support systems such as the Ask-an-Expert sites or online pen pals and discussion groups.

Students need to learn to evaluate the quality of information they find. Encourage them to compare and contrast different information resources. Consider the following ideas:

- *Authority.* Who says? Know the author. Is he or she stating fact or opinion? What knowledge or skills does he or she have in the area? Who created this information and why?
- *Objectivity.* Is the information biased? Think about perspective. Is the information subjective or objective? Is it full of fact or opinion? Does it reflect bias? If so, how?
- *Reliability.* Is this information accurate? Consider the origin of the information. Does the information come from a school, business, or company site? What's the motive? Information? Selling a product? Does this matter?
- *Relevance.* Is the information helpful? Consider the timeliness of the information. Do the facts contribute something new or add to your knowledge of the subject? Will this information be useful to your project?

When researching a topic such as homelessness, students should continually evaluate the information they receive. For example, what if students receive conflicting information from two different sources, or even from one source? They will need to develop ways to evaluate the credibility of the different sources they are using. The list of "Information Evaluation Tools" provides some Web-based guidelines for learning to evaluate the information they find.

Weaving

Weaving requires the highest levels of thinking. Information from various sources must be carefully combined to produce a coherent whole. Weaving focuses on the application and synthesis of information. Students originate new ideas, create models, and formulate plans. New questions emerge as the ideas are woven together: Can the problem be resolved? How? Who would need to be involved? Is it realistic? What can I do? Weaving ideas together is an important information-processing skill. As students develop their projects, they should do the following and ask themselves the corresponding questions:

- *Compare.* How is the information from different resources alike or different? Why does it vary? Compare and contrast sources and types of information.
- *Select.* What information is useful? Eliminate irrelevant information and keep the most powerful ideas. Be sure to cite your sources.
- *Organize.* What is the best way to arrange the information? Identify key ideas. Cluster information together into categories. Determine a logical order of presentation.
- *Express.* What is the best way to communicate your ideas to others? Synthesize the information into new words, develop a picture, create a chart, design a timeline, or make a video.

By following this process, students will be able to organize their information in a way that ensures that they will create a coherent project. When they investigate an issue like homelessness, they will need to compare the information they receive from all the sources they use, select the information they find to be credible and useful, organize it into categories, and find the best way to express it. For example, for the topic of homelessness, students could choose to focus only on the magnitude of the problem and possible solutions, comparing credible information and selecting only what is most useful. Finally, they could then organize it under the broad categories of "The Problem" and "Solutions" and then into subcategories.

Wrapping

Wrapping involves packaging ideas, solutions, and communications. Students should ask themselves the following questions:

+ Why is this issue important?
+ Who needs to know about it?
+ How can I effectively communicate my ideas to others?

Students need to consider how they will communicate their visions to others. Often, the type of packaging will depend on the intended audience. Students who are preparing a project on homelessness, for example, might produce a multimedia presentation for their class, a video for other teachers to use, or a printed report to send to local legislators.

Waving

Waving involves student activities that publicize their involvement in a project. Students share their ideas, try out new approaches, and ask for feedback. Waving is needed to gain the attention of their audience.

Waving a flag, volunteering at a soup kitchen, marching for a cause, making a presentation to a county board, publishing in an e-zine, or sending a video to a nonprofit organization are all effective ways for students to draw attention to a social issue and convey their ideas and opinions. Some students may contact local, state, national, or international agencies to share their ideas directly with organizations that can initiate change. Others may publish their projects in print or online form for other students.

Students who are investigating homelessness, for example, can volunteer to work at relief organizations, organize food and clothing drives, give presentations at school and for civic leaders, and contribute to online resources about homelessness in order to draw attention to the problem in their community and be part of the solution.

Wishing

Wishing is the reflection point in the project. Students think about how the project went and consider possibilities for future actions and activities. Students should ask themselves the following questions: What were the strengths and weaknesses of my project? What would I do differently? What would I change? How could I approach the problem from an alternative perspective?

It's helpful to explore the project from multiple perspectives. Teachers, friends, peers, and parents may be able to provide useful insights for future projects. For example, art, computer, and English teachers can give students different views on their projects.

After presenting their projects, students need to evaluate the success of their work. If they sent a report to local legislators, did they receive a response? If they worked on the homelessness problem, for example, and started a food and clothing drive, did they collect a large amount of food and clothes? Did these items get to the right people? If they presented the project to their class or school, did other students become interested and ask to help?

Conclusion

From term papers and speeches to Web pages and HyperStudio stacks, the "project" has become the classic activity in many instructional units. We sometimes forget that there's more to developing a meaningful project than simply choosing a topic and writing a paper. It is a process that involves watching, wondering, webbing, wiggling, weaving, wrapping, waving, and wishing. Students move through this process at their own paces and ability levels. You've probably noticed that some students wiggle physically, while others wiggle mentally. Being aware of individual interests and needs can help you facilitate projects that help students move from collecting information to creating knowledge. ■

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USING THE 8 WS

It's hard to teach students the processes of completing a research project, especially once they begin working on a complex project such as investigating a social issue. The activities presented here will help you teach your students each separate step in a way that they can understand before they start on their projects.

WATCHING

1. Begin with observation. Take a couple days to really explore the world around you. Keep a journal of what you see, hear, say, touch, and taste. Describe how you feel physically and emotionally.

2. Explore each aspect of your life, including your family, community, work, play, and school. Watch the interactions among your family members. Observe your friends and their actions. Explore the environment in which you live. If aliens were examining you and your community, what would they think?

3. Reach out to the world through newspapers, radio, television, and the Internet. What do you see and hear? What are some current issues of interest and concern? What problems need solutions? Which of these issues impacts your life directly or indirectly? Find newspapers and other periodicals from around the world at http://lcweb.loc.gov/global/ncp/lists.html.

4. Consider the future. How will the world around you change over time? How will you change? What will you be doing in 10 years? What will you be doing 25, 50, or 75 years from now?

5. Now make your journal more formal. Explore the Journal Writing Page (http://www.spies.com/~diane/journals.html) and incorporate some ideas from it into your own writing.

6. Finally, share your journal with a friend in your classroom or through an e-mail connection. Pick out your favorite parts to share. Ask your friend his or her ideas and opinions. Make a list of topics of greatest concern.

WONDERING

1. Before jumping into a project, brainstorm possible ideas. Read the following pages to learn how to brainstorm:
   • gopher://gopher.utexas.edu:3003/00/pub/uwc/Handouts/brainsto.txt
   • http://www.mindtools.com/brainstm.htm

2. Use your journal for ideas. Ask your family and friends for suggestions. Complete some of the following sentences:
   • I wonder …
   • I like …
   • I dislike …
   • I am in favor of …
   • I am opposed to …
   • I wish I could convince people that …

3. Examine your responses. Create a list of topics. Brainstorm a list of words or ideas associated with each of the topics.

4. Select one of the topic areas. Use the Picking a Topic worksheet (Worksheet 1) to brainstorm words that are broader than or narrower than words related to your topic. Also consider synonyms and alternative forms of the same word. These words will be helpful in searching for information on this topic.

5. Create a What I Know list for your topic. List your information in three categories: What I Know, What I Need to Know, and What I Want to Know. Later you can go back and answer two more questions: What have I learned? What do I still wonder about?

6. Develop a chart of Who, What, Where, When, Why, and How for your topic.

7. Use a variety of Internet search tools, including search engines, to locate information on your topic.

WEBBING

1. Create a web of information related to your topic or theme. Use the Theme Development/Webbing worksheet (Worksheet 2) as a model. Place the key word or idea in the middle, then weave a network of information around it. Start with information you already know about the topic. Next, go to the dictionary and encyclopedia for general information that might be helpful.

2. With some topics, it's helpful to cluster information into categories. Use the Classifying Information worksheet (Worksheet 3) for ideas.

3. Explore public opinion related to your topic. Check the USA Today Opinion Web site (http://www.usatoday.com/news/comment/debate.htm) and the Demographic Detective site (http://pathfinder.com/twep/detective/index.html). Compare the results with your own survey of people in your area.

WIGGLING

1. Use the Ask-an-Expert site (http://k12science.ati.stevens-tech.edu/curriculum/aska.html) to expand your project and answer important questions about your topic.

2. Search the Internet for other people who are interested in your topic and discuss it with them. For example, use Global Youth Dialog (http://www.kidlink.org/home-std.html) to discuss your topic with other students.

3. Use Kathy Schrock's Evaluation Page (http://www.capecod.net/schrockguide/eval.htm) to evaluate Web pages for your topic. Explore other sites that contain valuable information about evaluation.

WEAVING

1. Use the Compare and Contrast worksheet (Worksheet 4) to help organize and analyze information on issues for which there are two or more sides. For example, you might compare and contrast two views on public smoking. Or, you could compare fur and antifur perspectives.

2. Use the Creating a What-If Scenario worksheet (Worksheet 5) to examine the possibilities related to an issue. For example,

what would happen if UFOs landed? What would happen if we eliminated the current welfare system? What would happen if we tried an alternative form of punishment for particular crimes?

3. Use a Mind Map (such as the one found at http://world.std.com/~emagic/mindmap.html) to help organize your ideas regarding your topic.

4. Organize your thoughts in writing. There are lots of Web resources to help. Try the Writing Resources activity page (http://www.missouri.edu/~wleric/writehelp.html) and the Online Outline site (http://edweb.sdsu.edu/edfirst/OnLine_Outline/OnLine_Outline.html).

5. Be sure you cite your sources correctly. Use *Classroom Connect's* guide.(http://www.classroom.net/classroom CitingNet Resources.html)

WRAPPING

1. Select a product to develop, such as an action plan, a bumper sticker, a diorama, a pamphlet, or a research paper. (You can find more ideas at Info Zone, http://portal.mbnet.mb.ca/~mstimson/text/Producing.html/.)

2. Create a Web page. There are lots of Internet resources that will help you create a Web page. Start with CyberTrail (http://www.wmht.org/trail tender11.htm). The Nonprofit Prophets (http://www.kn.pacbell.com/wired/prophets/index.html) explores ways to communicate ideas about social issues through Web pages.

WAVING

1. Identify an audience. You've carefully explored issues, identified problems, and developed solutions. Who needs to hear, see, or read about your ideas? How can you have an impact? Explore ways to communicate your ideas to others. Check out the Social Activism Web site (http://www.excite.com/Subject/Personal_Home_Pages/Activism/Social_Activists/s-index.msn.html) for more information.

2. Publish. Explore ways to gain the attention of your audience. You may share your ideas with a local, regional, state, national, or international nonprofit agency, government organization, business, or industry. Use the Internet Yellow Pages (http://wws16.bigyellow.com) for organization names and addresses and Web addresses.

3. Publish on the Web. Explore e-zines and kids pages (http://www.hmco.com/hmco/school/kids/links/kids_4.html) where you might publish your written communications. Yahooligans (http://www.yahooligans.com/School_Bell/Newspapers/) has a listing of school newspapers to explore.

WISHING

1. Use the Information Skills Rating System (http://www.pacificrim.net/~mckenzie/libskill.html) to evaluate your project.

2. Explore online projects such as Kidlink (http://www.kidlink.org/KIDPROJ/) and NickNacks (http://www1.minn.net/~schubert/NickProjects.html) that you might join in the future.

3. Review the entire information exploration process on Info Zone (http://portal.mbnet.mb.ca/~mstimson/).

Picking a Topic

More Narrow

My Topic · Related Topics

More Broad

Worksheet 1

Theme Development/Webbing

Worksheet 2

Classifying Information

Worksheet 3

Compare and Contrast

Features

Worksheet 4

Creating a What-If Scenario

Real Situation · What-If Situation

Event · Person · Idea · You

Happenings · Details · Changes · Opinion

Compare

Contrast

Conclude

Based on Moss Pointe, MS What-If Model.

Worksheet 5