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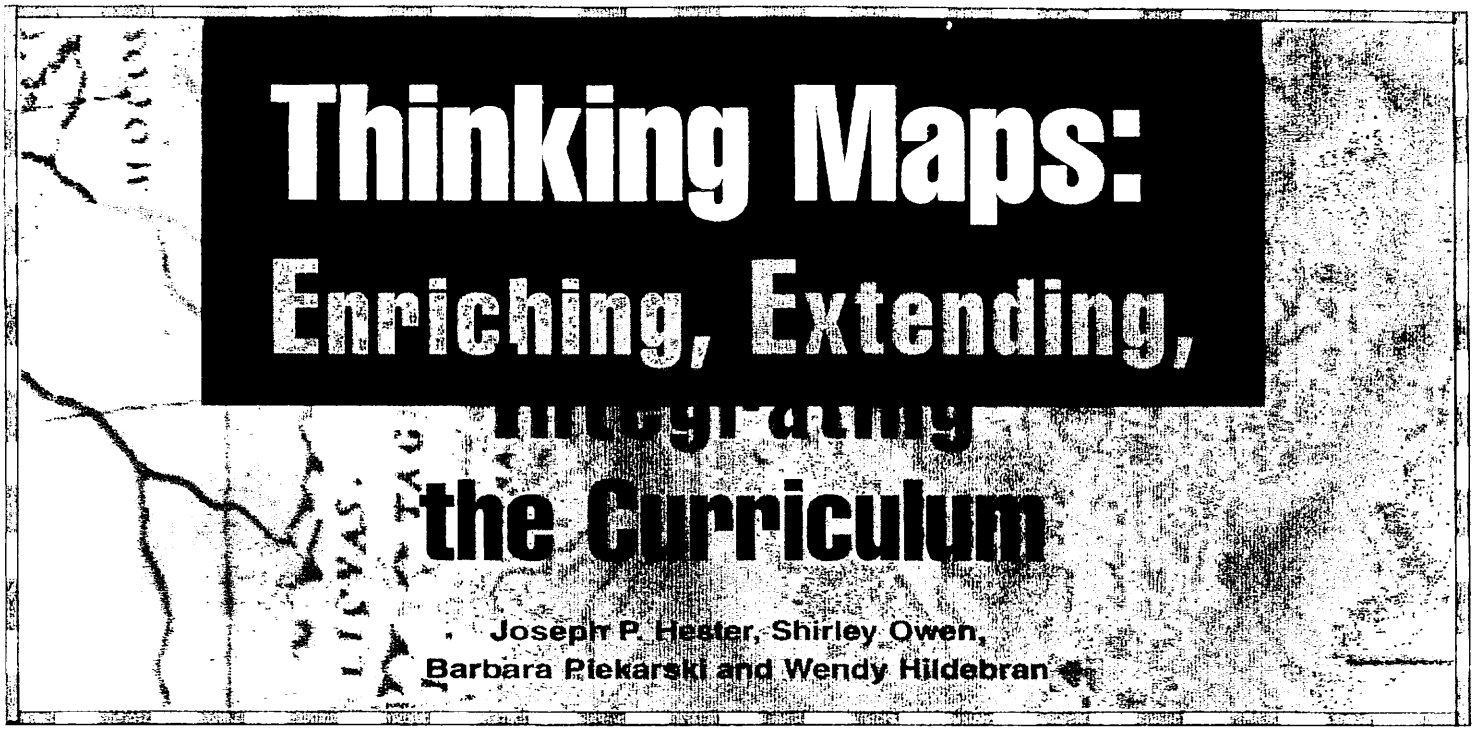

Thinking Maps: Enriching, Extending, Integrating the Curriculum

Joseph P. Hester, Shirley Owen, Barbara Piekarski and Wendy Hildebran

Background

It has been written many times that "to educate is to provide students with the motivation, knowledge, and skills to become life–long learners." This has been a goal of the Catawba County School System, although difficult to achieve, nevertheless worthy to pursue. In 1991–92, a planning team of teachers, principals, and central office supervisors was selected whose task it was to develop a long–range personnel development blueprint for training in critical thinking skills curriculum integration. From the onset the team did not think that critical thinking would be a separate course of instruction nor would it become a list of ten–minute exercises to "train the mind." Rather, research told us that to be effective, thinking skills must be completely integrated into the ongoing curriculum and used as a tool to teach, enhance, extend, and help integrate the curriculum across subject areas. Although we had many other ongoing programs (CRISS or Creating Independence through Student-owned Strategies, whole language, reading remediation, etc.) that required our attention and maintenance, we believed that teaching for thinking would enhance their productivity. Our task was to find a way to teach for thinking that did not take away from other areas of the curriculum.

The purpose of this article is to provide background and information on how Catawba County Schools developed and implemented a plan for integrating critical thinking skills into the school curriculum. Included is background on the planning process, on choosing a thinking skills program that fits the goals and purposes of the school and/or school system, on developing a long–range plan for implementation, on funding the training and materials, and on sustaining the plan and work of teachers over the long run.

In the summers of 1991 and 1992, several teachers and administrators trained with The National Center for Critical Thinking in Brookline, Mass. because the *infusion* method they had developed seemed to fit the framework we had established for a thinking skills initiative. (Infusion is a method that fully integrates thinking strategies into daily lesson plans.)

Together we asked this group to come to Catawba County in 1992–93 and train 120 teachers and administrators representing all of our schools and central office. To pay for this training, the director of instruction and the department of gifted education pooled their resources. Training teachers in critical thinking had long been a goal of the gifted department and the time seemed right to join forces with regular education in this process. Through an evaluation process, we discovered that although our secondary and some of our middle level teachers thought the training solid and useful, most of our K–8 teachers struggled to use the *infusion* method, as its lesson plan format was considered to be cumbersome. Not to be too harsh on the *infusion* method, we encountered it in its early stages when all the necessary materials had yet to be written. In our opinion, the method and materials were, at that time, not fully developmentally appropriate and therefore difficult to use.

In the spring of 1993, we were visited by a team from Innovative Sciences, Inc. who provided us with in-

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formation about a new program called "Thinking Maps." At first, the simplicity of the Thinking Maps Curriculum caused some of us to question its effectiveness. In June of that year a team member was invited to a three-day training session in Winston-Salem and saw first-hand how teachers were using Thinking Maps. Thinking Maps were being promoted as a tool for enriching, extending, and integrating the curriculum. Student materials were demonstrated and the program was shown to be developmentally appropriate with student and teacher materials for all grade levels. Evidence of the program's effectiveness was provided by remarkable increases in writing scores and achievement scores in units where the program had already been implemented in eastern North Carolina.

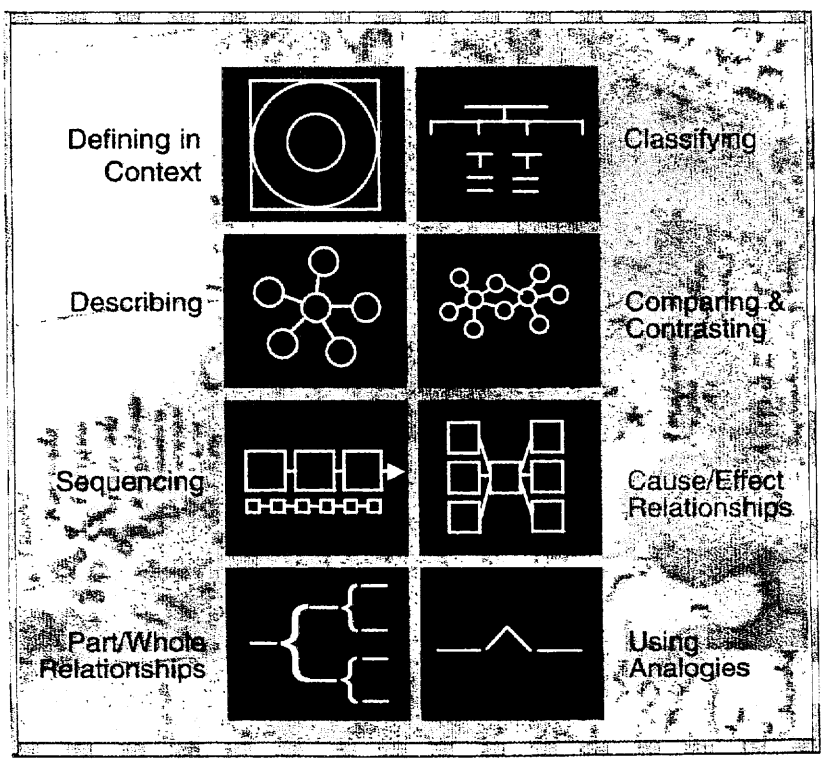
With this information in hand, we decided to use the Thinking Maps Curriculum. Research indicated that training whole faculties with extensive follow-up is the most effective personnel training process. In order not to repeat the mistake of the previous year, we began slowly and with one school. This school had traditionally had low test scores, so we believed it to be a good choice. The school received one full day of intense training in Thinking Maps and three days of follow-up (which included demonstration lessons, small group and one-on-one lesson plan design and support).

At the end of the 1993-94 school year, test scores from that school demonstrated outstanding growth, and, furthermore, its faculty seemed to have become rejuvenated and enthusiastic. In 1994-95 we added two additional schools to our training sequence and continued follow-up sessions in our first school. In 1995-96 we added another four schools, including a training of trainers (or Thinking Maps Mentorship program) symposium to help with new teachers coming into those schools which had previously been trained. We also continued the follow-up sessions in the other three schools.

We plan to continue this training pattern until all of our schools have been trained. We will provide another training of trainers symposium (in order to create a Thinking Maps Mentor Support Team in each school) in the near future and evaluate the process to determine what kind and how much follow-up will be required.

Thinking Maps

Thinking Maps provide teachers with a visual tool for developing lessons around eight different thinking skills and for integrating the school curriculum. (They include the eight skills presented in the chart on this page.)



Materials include: teacher training notebook, teacher guide to student workbooks and ideas for curriculum integration, student workbooks, wall maps, student cooperative learning desk maps, and sheets to make overheads and handouts for students. Computer assisted materials are being developed that will allow students to develop their lessons, using Thinking Maps, at computer workstations. One of the exciting things about using this program is that it is constantly being redeveloped using ideas from teachers and students. The consultants who deliver the program to our schools are former teachers and curriculum experts who are knowledgeable and involved in the teaching/learning process. They have provided their home telephone number to our principals and are constantly in touch. In Catawba County we have seen a consistent rise in test scores, student and teacher motivation, and interest since using the Thinking Maps program.

C. H. Tuttle Middle School

Although we are training all of our schools in the Thinking Maps program, the first middle school in our system to be served is C. H. Tuttle. The reader should note that six elementary schools have received training and five more schools, including two additional middle schools, will be trained in 1996-97. The entire faculty at Tuttle received their Thinking Maps training in the summer of 1994, after which three follow-up sessions were planned. The consultant from the Innovative Learning Group, Dr. Shirley Owen from Moore,

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was asked to work directly with the principal of the school and not to use the Central Office provider as a go between.

Circular Mapping (Integration)

One of the goals developed by the faculty at Tuttle was curricular integration or curricular mapping. The tool for this process would be the Thinking Maps program. By the second follow-up session, Shirley was working with teaching teams for approximately 45 minutes to 1 hour each. Together they planned integrated units around common themes and infused thinking skills and visual thinking maps into the process. They connected central theme and process and created the space to hold on to subject-specific content as well. This was not simply an exchange of recipes, integration by allusion. Rather, the teachers at Tuttle used one of their two planning periods each day to talk, plan and develop their lesson plans. They discovered within this process that the interaction of different languages and different contents created new meaning and presented them with fresh ideas.

In 1995, the principal at Tuttle, Kermit Whisnant, and Ms. Owen gave the faculty a summer assignment: they were to brainstorm integrated ideas based on subject/themes chosen by the faculty and be prepared to discuss these upon returning to school in August. This initiative was quite a success as teachers wrote interdisciplinary goals and developed integrated themes, topics and units. Teachers also learned that curricular integration requires that teachers need to function as a group, sharing, acting on interest, and reciprocating where need requires. They learned that integration through the Thinking Maps process requires these key connections and may take several different forms: combining classes, sharing class time with a team member, and adjusting the order and substance of lessons and units or activities to accommodate other subject areas.

One concern of teachers in their discussion and planning was not to lose content connections. At the middle and high school levels, teachers firmly believe that content cannot be set aside for process. This is why using Thinking Maps as a tool for integrating content has been such a plus. They discovered that content can be taught through (not with) process and that team collaboration has created new venues for applying skills and content and developing interesting activities for students. The comment heard the most is that using Thinking Maps and curricular mapping has been an exciting and efficient approach to teaching. Teachers not only connect content, but they guide students to connect learning and to see the relevance of learning to everyday life. (See end of article for lesson plan examples.)

The Thinking Maps program has had several advantages over other thinking skills programs. They include the following:

1. They provide a concrete and visual method for learning basic thinking skills.
2. They are a successful organizational tool for students because they force the organization of content material into thinking skill patterns.
3. They also emphasize curricular integration which brings content together in significant connections and aids student understanding.
4. Finally, as Thinking Maps are used, they can be placed in student portfolios for easy assessment.

One can readily see how using this program has increased our writing scores as organizational and thinking skills matured in students. The overall effect has been an upswing in writing, reading, and other achievement test scores which give evidence to student learning. And students love to use thinking maps. We have added to this program the desk map sequence which promotes cooperative learning and collaboration. In addition, as students become more proficient in their use, we plan to add Thinking Maps software to our computer labs so that students will be able to type papers and easily integrate thinking skills into their work (Note: A district level license will allow us to use this software in all school and central office computers, as well as to make copies for students to use on their home computers).

Creating Independence through Student-owned Strategies (CRISS) and Thinking Maps.

Blending Thinking Maps and CRISS training has given new vitality to teaching at C.H. Tuttle Middle School. Together, these two curricular strategies have provided some new tools for helping students to better understand and utilize their thinking and learning processes. Beginning in 1994 with a ten-hour Thinking Maps workshop, the Tuttle faculty has used eight maps and thinking skills to clarify relationships such as cause and effect, comparing and contrasting, analogies, and part/whole dichotomies. As this training continued in 1995-96, the faculty used Thinking Maps as a catalyst for creating teaching/learning units. Concurrently, the faculty completed Project CRISS training, adding a cadre of reading, writing, and study strategies to their teaching repertoires. CRISS techniques, along with Thinking Maps, are now used throughout the school to build units and lessons. Technology, Chinese New Year, and even pumpkins have been topics for some of our integrated units.

One requirement of the CRISS training has been for each teacher to implement a CRISS strategy in class related to a Thinking Map. Each teacher was then to review and highlight his/her lesson during a faculty meeting. For example, in science, students used two-column notes to define conduction, convection, and radiation, then organized what they learned on a Tree Map. A resource language arts class used colored

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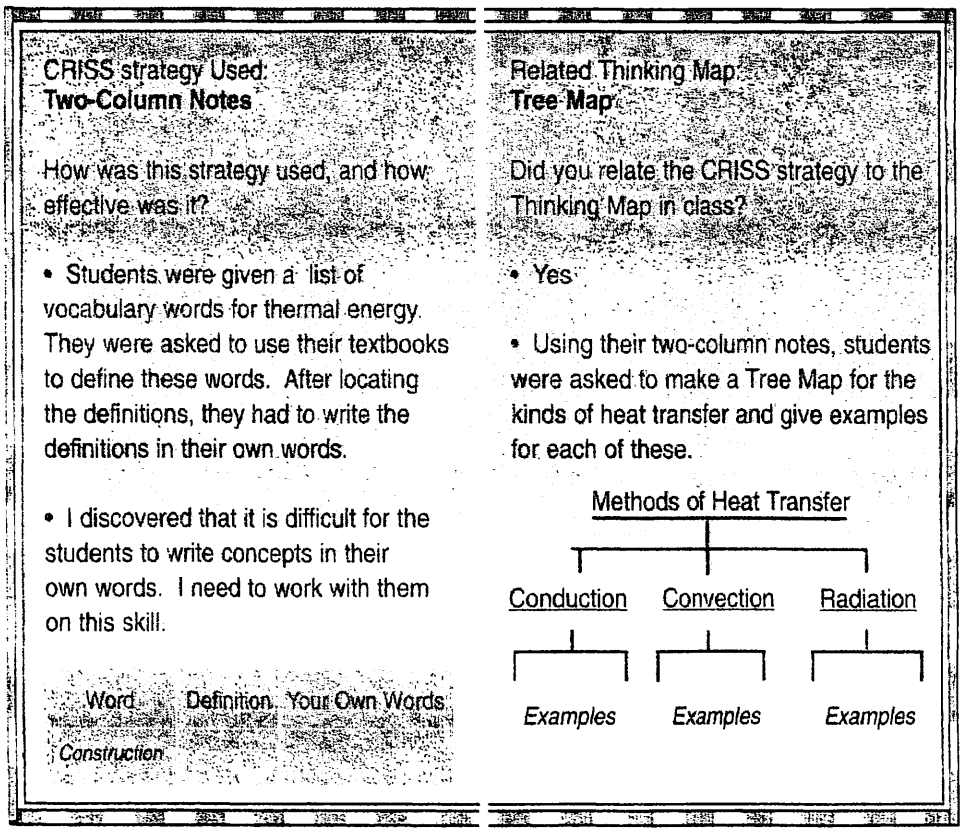
markers to selectively underline plot, characters, and setting. A Tree Map was then used to record the story elements. Other classes related KWL (**What do you KNOW?/What do you WANT to know?/What did you LEARN?**) charts and Double Bubble Thinking Maps (or concept maps) and Flow Maps.

An example of integrating a CRISS strategy and a Thinking Map process is provided in the following example:



The parallels of the two programs are numerous and can be used to reinforce learning in many different ways. Seeing the creativity and talent of one's peers has been a great experience as the faculty shared what they were teaching. A far greater benefit of this process is that the students are understanding the connections between language arts, math, science, social studies, music, and the rest of the curriculum.

To culminate two years of training and a lot of learning, the entire school took part in an integrated unit on the Olympics during the spring of 1996. Each team used the theme for about two weeks in classroom activities. The finale was an actual olympics. Fine arts classes held the opening and closing ceremonies, complete with anthems and awards. The physical education department will run the athletic events. Each team represented a continent, and each homeroom a specific country. We made this school year a memorable success, and hope to build on our efforts to incorporate CRISS and Thinking Maps when school opens in August.

Reading Initiative and Thinking Maps

It has been our experience in Catawba County Schools that students have had difficulty with comprehension or connecting meaning to the words they read. This requires understanding and use of the basic higher order thinking skill of inferring. Inferring is the key to explanation and understanding, hence, to meaning. It is the underlying intellectual skill that mediates between reality and understanding, making explanation and meaning possible. Related skills are hypothesizing, predicting, generalizing, drawing conclusions, and analyzing relevant and irrelevant ideas and data. Test results also document that questions requiring higher order thinking are those most often missed.

The District Leadership Team (DLT) for the Catawba County School System set a goal of developing and implementing a collection of strategies for teaching communication skills to grades K-12. The DLT encouraged teachers to investigate and stay abreast of proven research and new trends in curriculum, methodologies, disciplines, and technologies associated with these skills at every developmental level. Consensus was reached among teachers and administrators that teacher modeling, student discussion and strategies for constructing meaning were all important for successful reading skill development. The district reading committee was charged with finding programs that provide teachers with strategies that promote and support discussing and connecting ideas. We agreed that language is an expression of thinking and thinking is the manipulation of a person's internal representations of the world. We also discovered that a clue to how students think is found in the metaphor of *interconnecting*. The concept of *interconnecting* reminds us that, like adults, students understand their world and develop meaningful connections with others, with events that occur around them, and with ideas discovered while reading, through association or inferring. Inferring is the key to language development and, hence, to learning. It is the connecting of words with words and words with experience, all of which ignite conceptual thought and meaning.

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Integrated into the Catawba County reading plan were several programs that would help meet our goal of increasing inferential ability and, thus, reading ability. The National Diffusion Network project that met this need was CRISS, which is a collection of proven reading strategies that work across the curriculum. Another was the use of DIALOG groups that involve small group discussions of literature read among students at the same reading level. The THINKING MAPS program provided a catalyst for bringing these programs together holistically. It is an excellent method for teacher modeling and of constructing meaning and related information graphically while integrating higher order thinking skills into the reading process. All of these programs were delivered to teachers through training at the school site and with additional opportunities for discussion and follow-up. It has been the experience of the system that consistent training beyond a one-time workshop is essential for successful independent use and ownership of new ideas and new programs.

Developing a Long-Range Plan for Implementation

Because the materials and training in the Thinking Maps are expensive, the school or school system needs to develop a long-range plan for implementation. This plan will include budgeting and developing a plan for funding, which can come from many different budgets: exceptional children, gifted, vocational, regular staff development funds, PTO funds, and grants, for example. It also includes setting forth goals and objectives for using Thinking Maps, a training and retraining sequence, and follow up. Sustaining the plan and the work of teachers over the long run is evidence of administrative commitment. Site-based planning using building leadership teams, along with central office personnel who may be called on to assist with funding, is essential. In Catawba County we developed a five-year plan which, because of the cost and the growth of the county, is now being extended for two additional years.

Don't forget the cost of follow up. Your personnel development plan will succeed if and only if teachers and administrators are committed to its goals, funding is allocated, and if planned and sustained follow up is built into the plan for the years ahead. Because of our commitment to this program, we have built in follow up for three years after the initial year for each school, and we plan to continue this sequence on an at-needs basis for as long as it takes to build the program. Also, as new teachers are added in each school, they will need training and support. Each year we make a note of who has been hired, see to their training and purchase materials for their use. You can see that in order to be effective, this program requires commitment, follow up, and sustained maintenance. It is not a one-time deal, a fad, or a quick fix. Someone at the school and central office level must oversee and coordinate these efforts to get maximum use in the teaching/learning situation.

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Lesson Plan Examples

Grade 7 Interdisciplinary Theme: "The Japanese People and Their Culture"

Communication Skills (Goals 1-4)

- Plot development
- Character analysis
- Analyze/organize ideas
- Response to literature
- Haiku poetry

Novels:

The Big Wave

The Master Puppeteer

Secret of Sumarai Sword

So Far From the Bamboo Grove

Computer Skills (Goals 1-3)

- Technology-based society
- Create data maps of Japan
- Use weather database

Career Education

- Working world of Japan and United States

Social Studies Skills (Goals 1-12)

- Five themes of geography
- Government
- Religion/beliefs/ culture
- Social needs
- Interdependence
- Guest speakers
- Skits
- Japanese Day
- Foods, dress, etc.

Science Skills

- Ecosystem (goal 5) (Hiroshima's effect)
- Weather
- Technology
- Current events

Math Skills

- Compare metric and standard systems (goal 4)
- 3-D figures (goal 2)
- Solids and cylinders (goal 4)
- Data analysis (goal 6)
- Ratio/proportion (goal 7)
- Build kites
- Graph population growth

Spanish

- Compare/contrast Japanese & Hispanic culture

Art

- Origami
- Calligraphy
- Print making

Music

- Multicultural music
- Sakura music
- Pentatonic scale

Dance/Drama

- Katuki play

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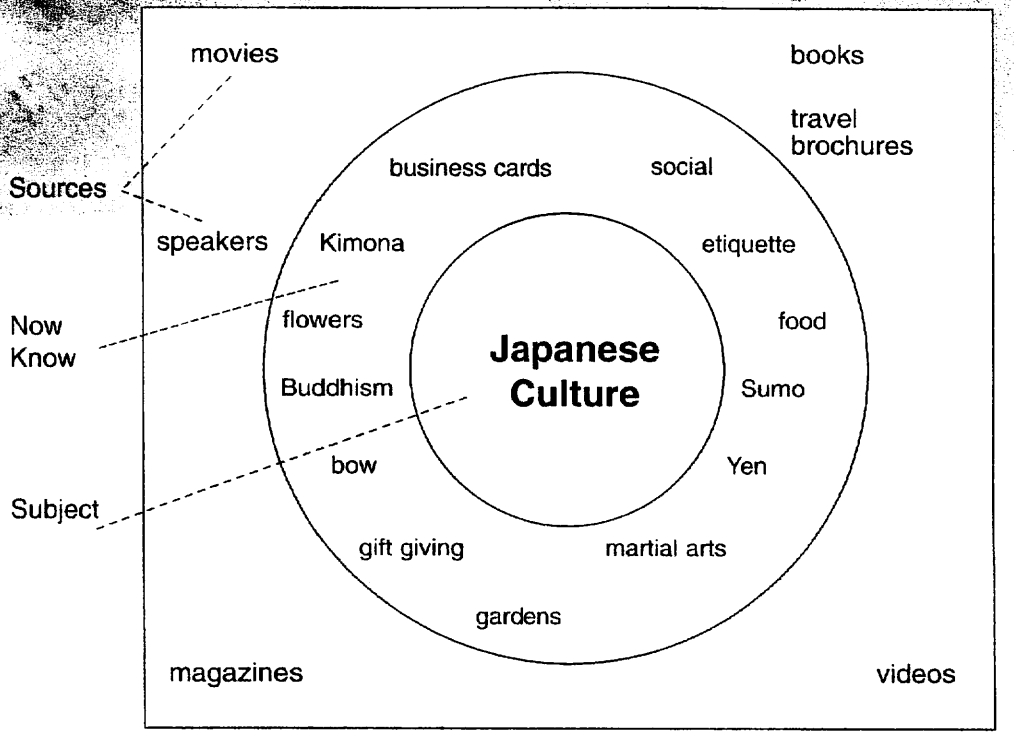
Grade 7 - The Japanese Culture
(Utilizing seven thinking maps)

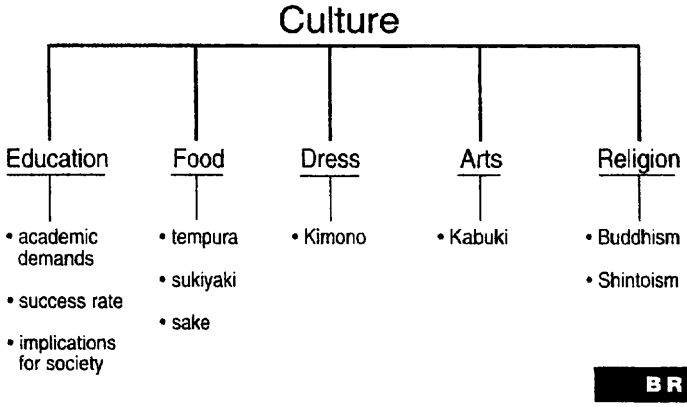
CIRCLE MAP

(Defining in Context)



TREE MAP

(Classifying)

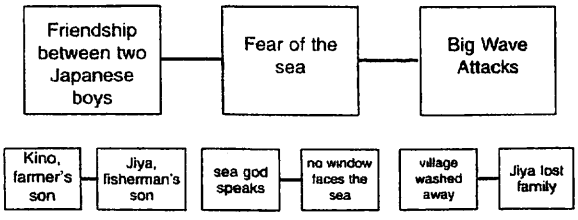


FLOW MAP

(Sequencing)

The Big Wave

Student are to fill in the blocks sequencially with the three major events of the story.



BRIDGE MAP

(Analogies)

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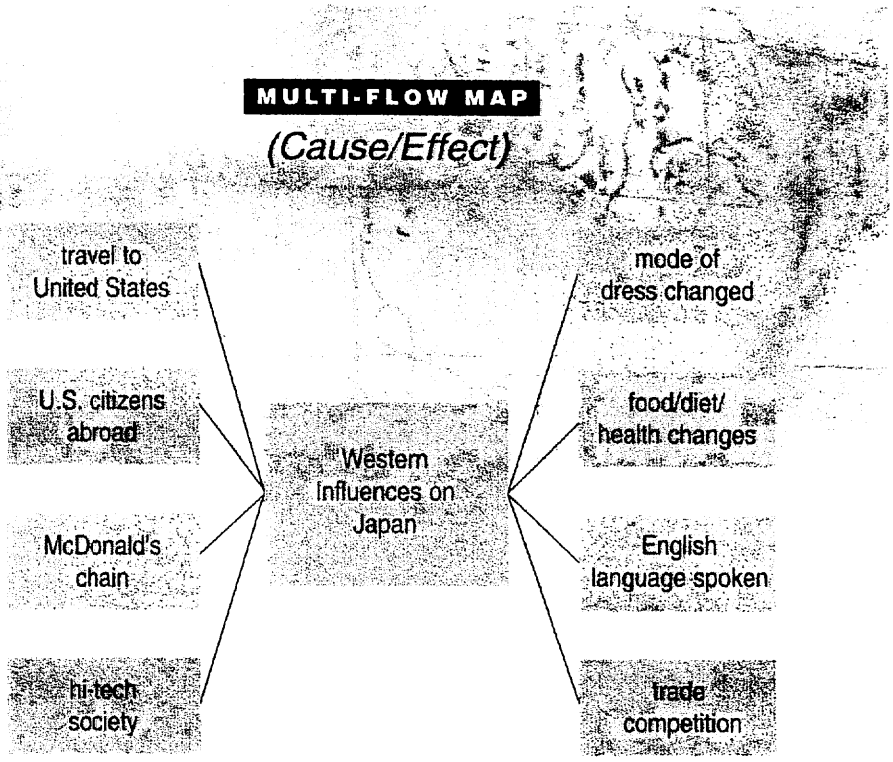
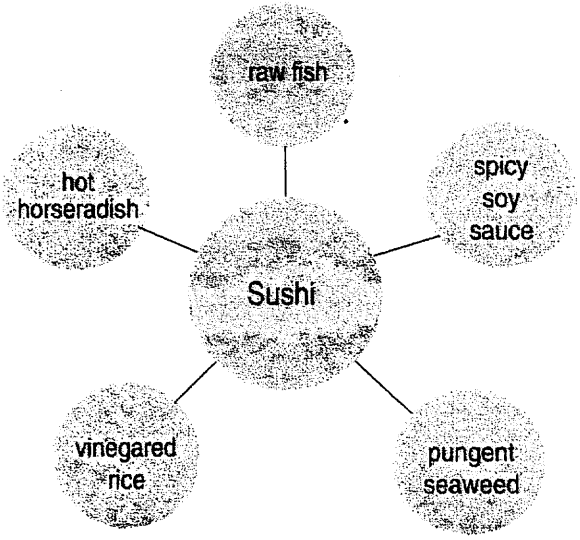
MULTI-FLOW MAP

(Cause/Effect)



BUBBLE MAP

(Describing)



DOUBLE BUBBLE MAP

(Compare & Contrast)