Thoughts on Thinking Maps: A New Way to Think

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Abstract:

Thinking Maps are a set of eight graphic organizer techniques used in education to provide a common visual language to information structure. They follow the eight basic metacognitive functions. Thinking Maps are visual representations of thinking and help students see their own learning pathway or the thought processes utilized to solve a problem.

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Born in Chicago, Illinois, Nishat holds several degrees and memberships to professional organizations. She earned a BS in Microbiology from California State University – Los Angeles in Los Angeles, CA in 2005. She, then, went on to earn a Masters in Clinical Microbiology from The University of Nottingham in Nottingham, UK in 2006. Nishat has been teaching full-time for the last seven years and part-time since 2000. Nishat is a member of the National Science Teachers' Association, the California Science Teachers' Association, the Los Angeles City Teachers' of Mathematics Association, and the California Math Council. Nishat is a dedicated, enthusiastic, hard-working 5th & 6th grade teacher at New Horizon School – Los Angeles. In addition to her teaching role, she is the Director of Curriculum & Student Affairs at New Horizon School – Los Angeles, a member of the LA County Science Fair Advisory Committee, a past ISNA Education Forum presenter, a past ALDEEN Foundation presenter, a past West Coast ISNA Education Forum presenter, the WASC Steering Committee Chair at her school, organizer of several of the school's social events, competitions, the Annual Interschool Spelling Bee, Who Wants to Be a Champion?, and publisher of *The Weekly Bulletin*, the school's only weekly communication with the parents and community.

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The new buzz in education revolves around the adoption and implementation of the new Common Core State Standards. These "new" standards are laced with an emphasis on critical thinking skills. Many veteran teachers, familiar with the "new" Common Core State Standards can tell you that these standards maybe newly packaged, but the standards themselves are not and the emphasis on the real-world critical thinking skills embedded in them is certainly not.

Thinking Maps are one tool used in successful classrooms to promote metacognition amongst students. Art Costa of The Thought-filled Curriculum stated, "Although thinking is innate and spontaneous, skillful thinking must be cultivated." This is the crux of all of education – teaching students how to think and reason. Thinking Maps are one tool to fulfill this mission. Thinking and reasoning are the basis of all testing and all life decisions. Students must be able to think and reason for themselves, to make the best choices for them in their lives. Every decision a student makes has the gravity to impact their lives for years to come, from the decision to study for the test to the decision about what major to choose and to apply to college, vocational, or technical school. These are just a few of the decisions that will plague them in their lives. It is our responsibility as educators to provide our students with the tools and instruction necessary to succeed. The eight thinking maps, all designed to hone a different thought process, link a specific cognitive process to a unique and dynamic visual representation. At every level of education, students utilize the same basic thought processes – the eight highlighted through thinking maps. This allows thinking maps to be easily used across the curriculum and especially with our English Language Learners.

Thinking Maps were the brainchild of Dr. David Hyerle as "a type of language to be used across grade levels, content areas, and disciplines so that students may learn more effectively and efficiently." The Thinking Maps model came out of his quest to integrate content learning, thinking process instruction, and collaborative leadership across whole schools in the 1980s. Dr. Hyerle refined his model into the current version of the Thinking Maps with theoretical and practical applications in 1993. Along with his colleague, Chris Yeager, Dr. Hyerle started writing books and provide professional development opportunities to make Thinking Maps accessible to everyone. A couple of Dr. Hyerle most pertinent books regarding Thinking Maps are Thinking Maps: A Language for Leadership and Student Successes with Thinking Maps.

Thinking Maps are a set of eight maps based on cognitive skills that support the brain's natural tendency to detect patterns. For this reason, the maps are used across the curriculum, in any subject. Often times, more than one map is used for a particular topic highlighting different cognitive skills visually. Thinking Maps are a type of graphic organizer techniques used in education to provide a common visual language to information structure. They are visual representations of thinking and help students see their own learning pathway or the thought processes utilized to solve a problem. "These maps often help promote reading comprehension, the writing process, problem solving, and thinking skills" (Winfield, 2012). These Thinking Maps can be used on their own or

in tandem with other Thinking Maps to create a common visual language for students and teachers at all grade levels and in all subject areas.

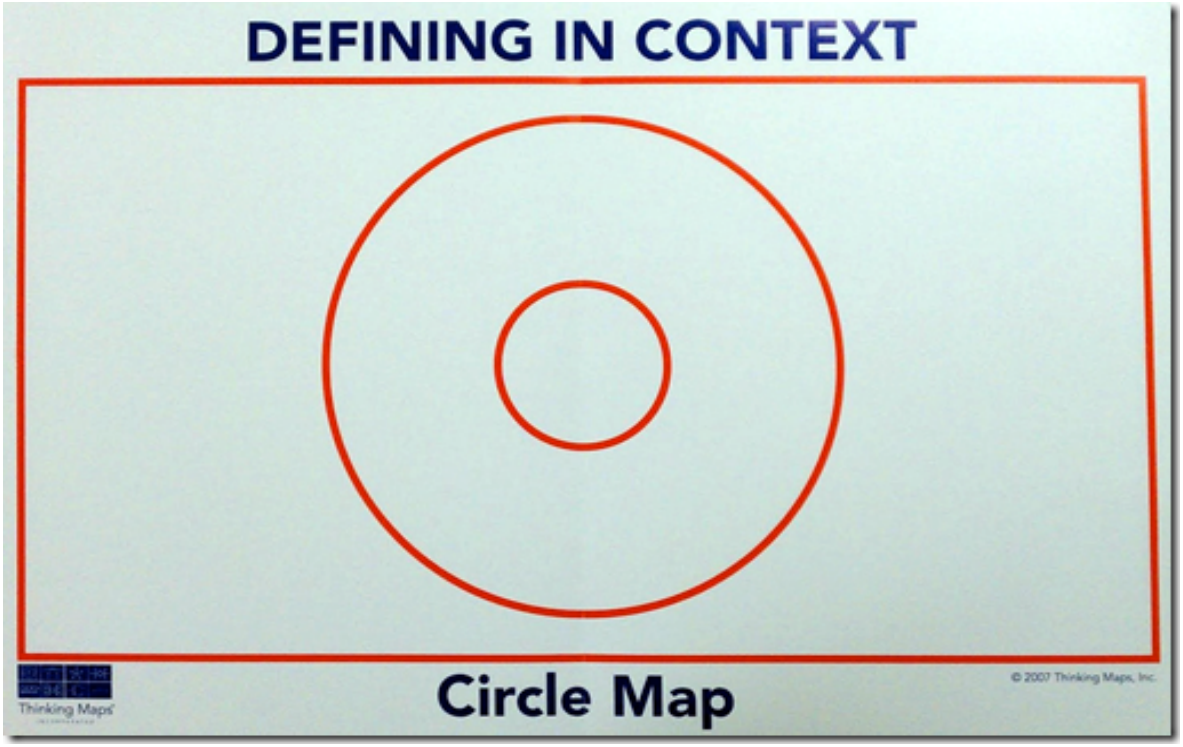
There are many benefits to using Thinking Maps in the classroom. The benefits of using Thinking Maps in the classroom include the stimulation of the brain's natural tendency to detect patterns. Another benefit is the creation of a common visual language that is cross-curricular and cross-grade level, while also having students cement their learning by tethering new information to each of their individual experiences and understandings. Yet another benefit is that Thinking Maps require students to move and interact, accessing their semantic and episodic memories to strengthen connections and support all learning styles and language proficiencies that sustain the construction of meaning. Yet another benefit is that Thinking Maps can serve as tools of formative and summative assessment gauging student progress while lending itself to differentiation and supporting student critical thinking skills.

Some may ask what is special about Thinking Maps – they just appear to be graphic organizers. Not as such, though. The similarities between Thinking Maps and general graphic organizers are that they are both visual tools for teaching and assessment and both can be highly successful due to their basis of concrete patterns. There are several significant differences between the Thinking Maps and general graphic organizers. Isolated tasks and defined structures generally form the basis of graphic organizers. These severely restrict the thought process to fill a clearly defined space, the size of the existing boxes. Additionally, graphic organizers are difficult to transfer from one subject to the other and are mostly teacher-oriented. Fundamental thinking skills and flexible structures form the basis of Thinking Maps. This makes Thinking Maps open-ended with plenty of space for complete thoughts and ideas. Additionally, Thinking Maps easily transfer across subjects and are student-oriented.

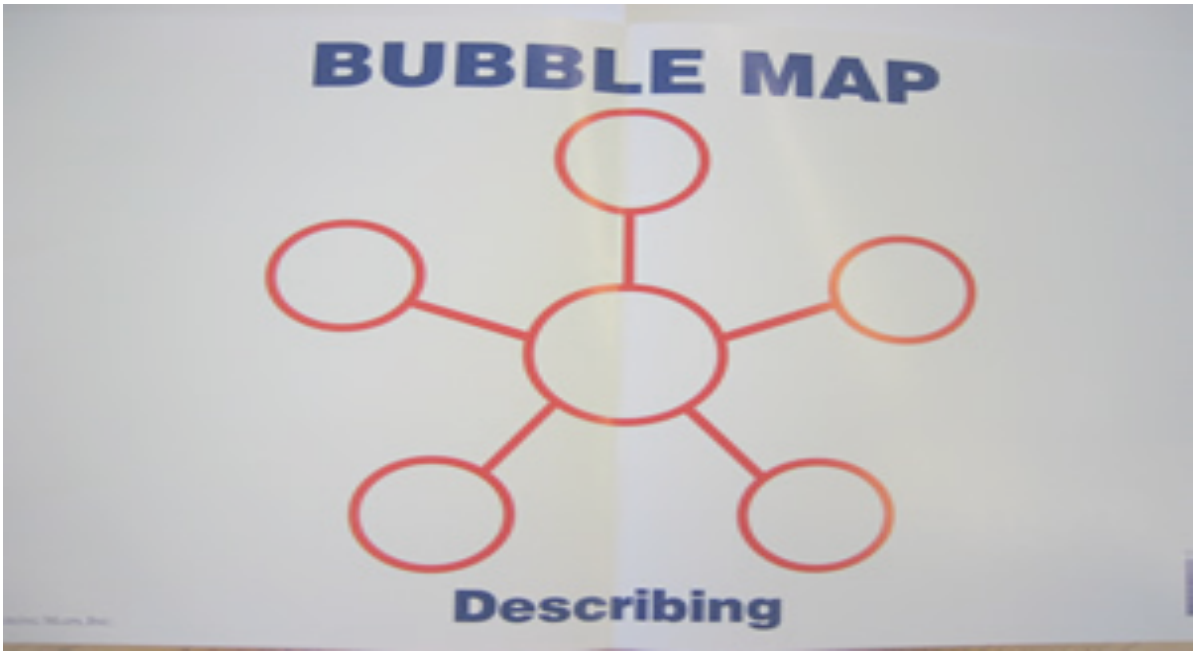
Now why are Thinking Maps effective? Thinking Maps are effective because they identify eight fundamental thinking skills and describe how these skills work in unison, (Hyerle, 1993). Thinking Maps clearly define cognitive skills, drive learning, eliminate the confusion that can come from static graphic organizers, link to unique, dynamic visual representations, support students by enabling them to move from concrete to abstract concepts, think with depth, and directly apply their thinking to complex tasks. The brain is a natural pattern detector and is constantly trying to respond to emotions and make incoming information meaningful. Thinking Maps support the brain in these basic quests. Thinking Maps support the brain in making patterns from content specific information by displaying this information in visual-spatial-verbal forms. This makes learning meaningful for students because it links the information they are learning to their own emotional frames of reference and give them ownership of their thinking processes and their learning. Thinking Maps give explicit pathways for thinking about thinking resulting in improved student performances. Thinking Maps allow for the accurate tracking of student performance over time and give students lifelong thinking tools that they may carry across their lives and academic careers.

The eight Thinking Maps along with their cognitive function described here are the Circle Map, the Bubble Map, the Double Bubble Map, the Tree Map, the Brace Map, the Flow Map, the Multi-Flow Map, and the Bridge Map. They highlight the following cognitive thinking skills: Defining in Context, Describing Qualities, Comparing and Contrasting, Classifying, Part-Whole, Sequencing, Cause and Effect, and Seeing Analogies. These cognitive skills are applicable in any subject area and at every age group. Students in the lower grades may begin by drawing pictures, which can gradually be replaced with words as they get older.

Circle Maps highlight the "Define while in Context" thinking process. They answer questions related to defining a concept, thing, or idea in specific contexts. "The Circle Map is designed for: defining a word or concept based on the context of the current investigation and study and prior knowledge about the concept and brainstorming ideas and thoughts about a topic" (Hyerle & Yeager, 2007). Construction of a Circle Map begins with a word or symbol being placed in the inner most circle. This would be the concept, word, symbol, etcetera that to be understood or defined. Context information that gives definition to the topic makes up what is written or drawn in the outer circle. The information in these two circles together define a topic. Circle Maps are used mainly for brainstorming ideas. They can be used on their own or as a starter map before another map. Circle Maps should be filled with key words, phrases, descriptors, and / or illustrations. Circle Maps provide a formative assessment of what the student knows at that moment in time and any misconceptions that they may hold. Circle Maps have many applications, such as: vocabulary development, brainstorming, accessing prior knowledge, or reviewing after lessons.

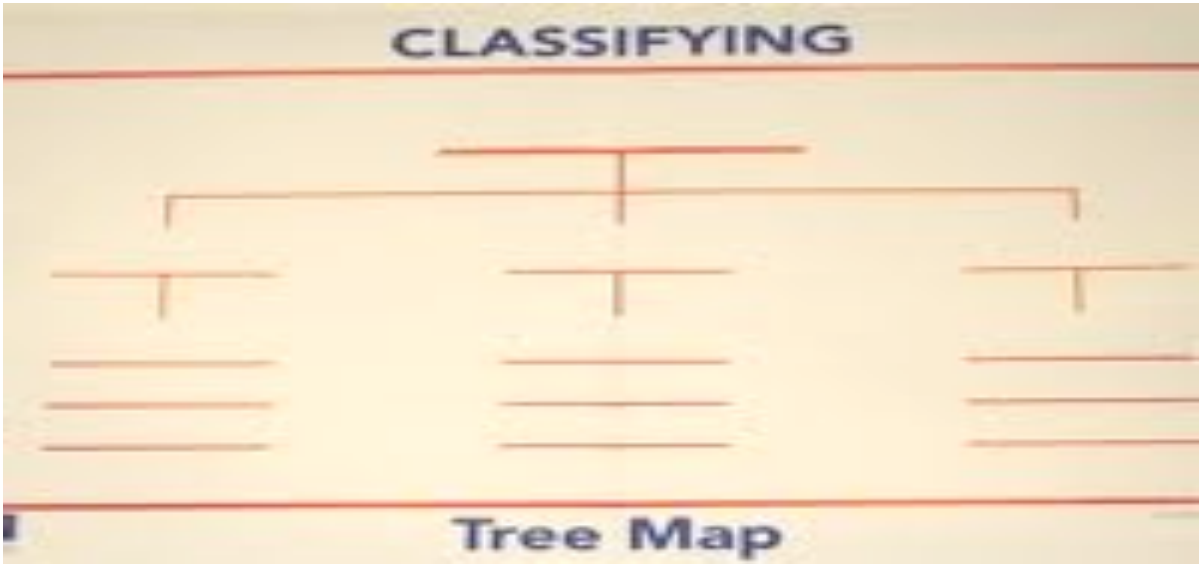


Bubble Maps highlight the “Describing” thinking process. “The Bubble Map is designed for: describing using adjectives and identifying the sensory, logical and emotional qualities of any topic or concept” (Hyerle & Yeager, 2007). Construction of a Bubble Map begins with a word or symbol being placed in a larger inside circle. This would be the concept, word, symbol, etcetera to be described. Adjectives describing the noun in the inner circle are written in bubbles connecting to the inside circle. Key Words used to guide the construction of the Bubble Map include: describe, use vivid language, use your five senses, qualities, attributes, characteristics, and properties. Bubble Maps are like webs, clusters, or mind maps, but with a different purpose. Students can write words inside the circles or draw pictures based on their developmental age.

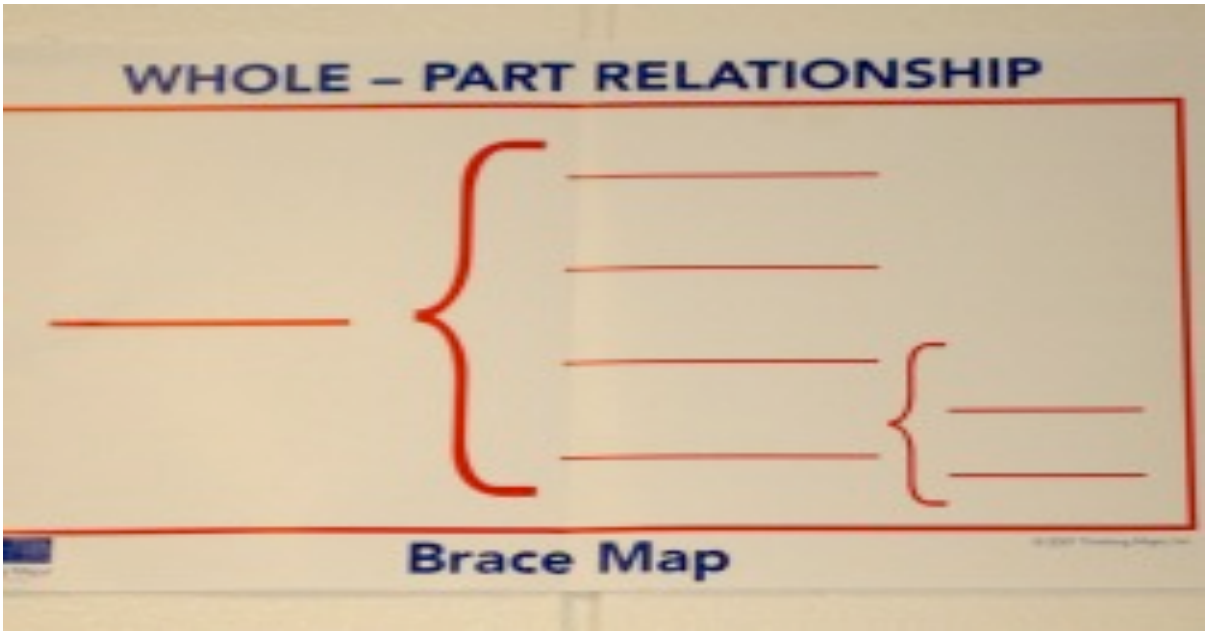


Double Bubble Maps highlight the “Comparing and Contrasting” thinking process. “The Double Bubble Map is used for comparing and contrasting any two things” (Hyerle & Yeager, 2007). Construction of a Double Bubble Map begins with drawing two large circles and writing the items to be compared in their centers. Then adding middle bubbles for words, phrases, or symbols that show similarities between the two items. Finally, outside bubbles can be added connected to the two things being compared listing words or phrases that identify differences. So the inside bubbles show similarities and the outside bubbles show differences. Key Words used to guide the construction of the Double Bubble Map include: compare, contrast, similarities, differences, distinguish between, and differentiate. Double Bubble Maps can be used to compare anything that students are studying, requiring students to think about the idea or concept as points with counterpoints. Double Bubble Maps are similar to Venn Diagrams, but are not as limiting. They can lead to writing projects for students.

Tree Maps highlight the “Classifying or Identifying” thinking process. “The Tree Map is used for: classifying or sorting things and ideas into categories or groups and grouping main ideas and details” (Hyerle & Yeager, 2007). Construction of a Tree Map begins with writing the category name or main idea of the topic on the top line. Then drawing connection lines going down to sub-categories or supporting ideas. Finally, below each sub-category or supporting idea – lines listing members or details of that sub-category or supporting idea appear. Key Words used to guide the construction of a Tree Map include: classify, sort, categorize, identify main idea and supporting idea, give sufficient and related details, and kinds of taxonomy. Tree Maps allow students to classify information based on their attributes or details. For a slight variation, Tree Maps can be used inductively through reverse construction (starting with the individual members and working backwards to the main topic).

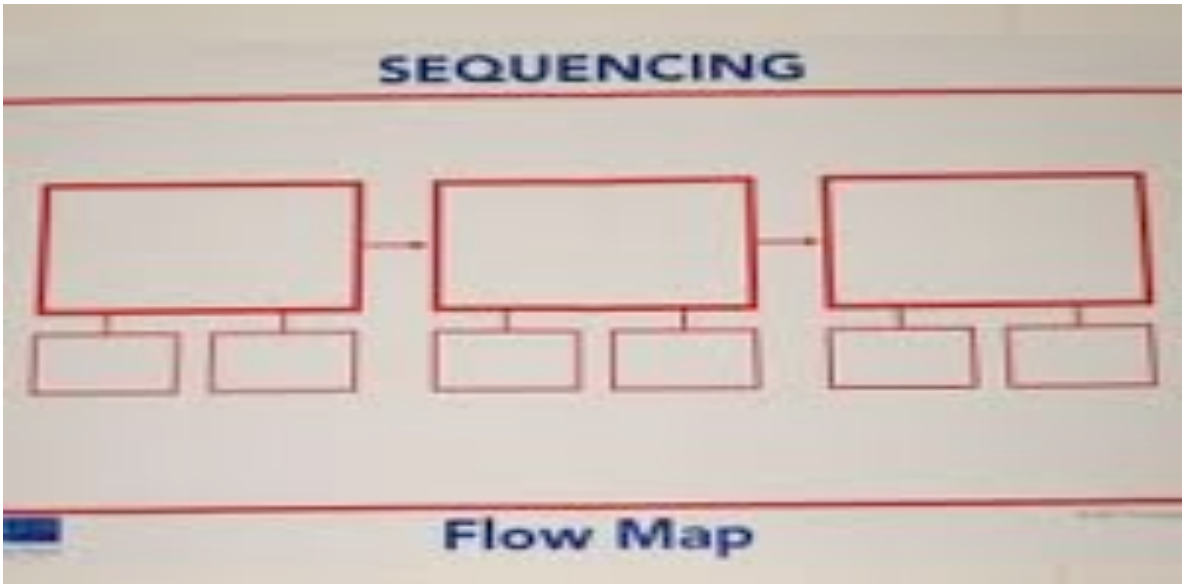


Brace Maps highlight the “Whole to Part” thinking process. The purpose of the Brace Map is to identify the whole to part relationship while analysing physical objects. “The Brace Map is used for: analysing the component parts of physical objects and identifying the spatial relationship of parts to the whole or “structural analysis” (Hyerle & Yeager, 2007). Brace Maps are special – they must be about actual, tangible, physical objects, in order to identify the parts. Construction of a Brace Map begins with a word or symbol being placed on a line to the extreme left, this is the whole. The lines in the middle of the sets of braces should be filled with words describing parts of the whole to the left. The lines to the extreme right are for major parts of the parts of the whole. Key Words used to guide the construction of a Brace Map include: parts of, show the structure, take apart, identify the structure, physical components, and anatomy. Brace Maps do not require specific words, so they are good for vocabulary development. The braces behave like equal signs, setting the two sides are equal and the sub-parts have an implied addition symbol. Brace Maps can be used to analyse any concrete physical object such as structures in science, parts of a number in math. Brace Maps can be trea

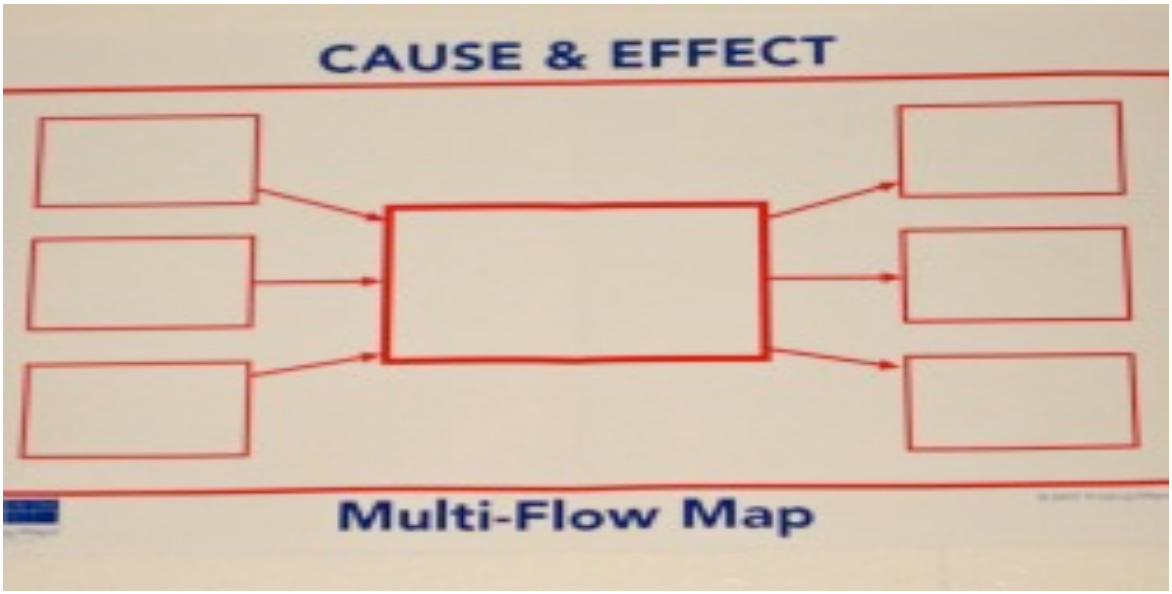


Flow Maps highlight the “Sequencing” thinking process. They answer questions related to order. “The Flow Map is used for: sequencing the stages and sub-stages of an event, identifying the steps in a process, and ordering information” (Hyerle & Yeager, 2007). Construction of a Flow Map begins with the name of the event being written above the first stage, then writing the major stages of the events in the large rectangular boxes flowing from left to right, and finally writing the sub-stages of each major stage in the smaller rectangular boxes below. Key Words used to guide the construction of a Flow Map include: sequence, put in order, retell/recount, cycles, patterns, show the process, and solve multi-step problems. Flow Maps can be written horizontally, vertically, or in any direction as long as all the stages are connected. Students may draw their stages cyclically, as rises and falls, or to show comparisons or degrees. Flow Maps show the order of objects from smallest to largest. Common uses of Flow Maps include life

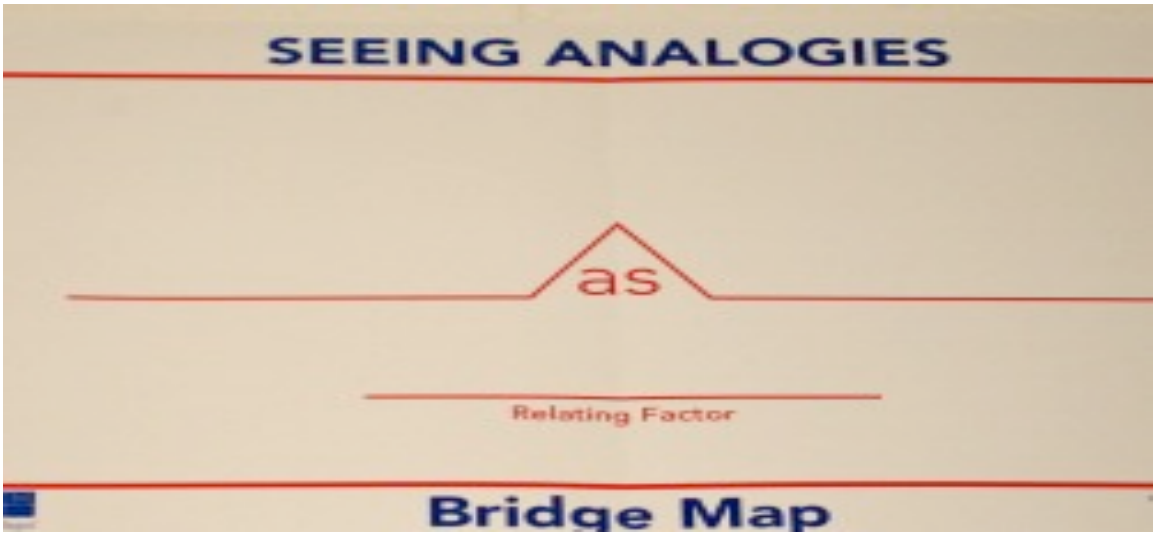
cycles, problem-solving, historic events, and time lines. Flow Maps do not need to include the sub-stages of the major stages.



Multi-Flow Maps highlight the “Analyzing Cause and Effect” thinking process. They answer questions related to cause and effect. “The Multi-Flow Map is used for identifying causes and effects of an event” (Hyerle & Yeager, 2007). Multi-Flow Maps illustrate and analyse cause and effect relationships. Construction of a Mult-Flow Map begins with an important event being written in the large center box. On the right of the large center box, connected with arrows are the effects of that major event. On the left of the large center box, connected with arrows to the center are the causes of that major event. This illustrates how the causes lead into the major event and how the effects come out of the major event. Key Words used to guide the construction of a Multi-Flow Map include: causes and effects, discuss the consequences, “what would happen if?,” “if . . . then,” predict, describe the change, identify the motivation behind, “identify the results of,” and “what happened because of?”. In Multi-Flow Maps, the number of causes do not have to equal the number of effects. Multi-Flow Maps can also be constructed as one-sided to just illustrate causes or effects of an event. Applications of Multi-Flow Maps include historic analysis, reading and predicting events, behavior management.



Bridge Maps highlight the “Seeing Analogies” thinking process. “The Bridge Map is used for identifying similarities between relationships and creating analogies” (Hyerle & Yeager, 2007). Construction of a Bridge Map begins with the relating factor or the relationship between the top and bottom phrases, symbols, or words. The relating factor needs to be written on the line labelled “Relating Factor.” The construction continues by writing the first pair of terms that share this relationship on the left side and a second pair of terms that share this relationship on the right side. The line of the bridge represents that the relating factor is bridged over the connecting the two terms analogously. Key Words used to guide the construction of a Bridge Map include: identify the relationship, guess the rule, symbolism, metaphor, allegory, analogy, and simile. Bridge Maps help students identify relationships among words and as long as the relationship holds true, the bridge can be extended to more than two pairs of words. Possible applications for Bridge Maps include: scientific concepts, historic events, and mathematical relationships.



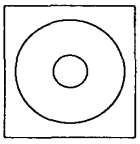
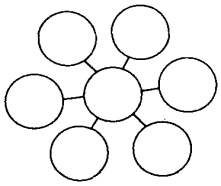
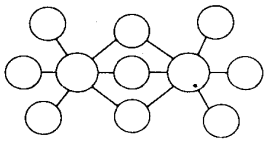
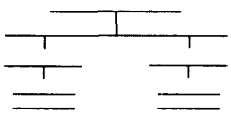
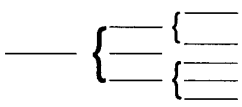
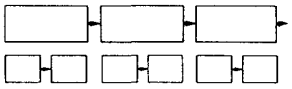
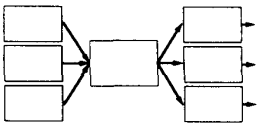
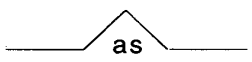
Additionally, a Frame of Reference can be added to any map. Frames of Reference allow students to frame their maps within three metacognitive ideas ("How do you know what you know?" "What is influencing the information in your map?" or "Why is this information important?"). A Frame of Reference is a box drawn around any map. It gives students a way to reference their maps within specific contexts. Each Frame of Reference can be individually tailored to meet the specific need / curriculum / context of the purpose of the map. Frames of Reference answer specifics regarding prior knowledge, specific sources, point of view, and other influences. Frames of Reference give context to the information displayed in the particular Thinking Map.

These visual learning tools require a specific implementation process. They must be a collaborative effort of teachers, administrators, parents, and students. It takes a total of 9 weeks to effectively introduce each of the 8 Thinking Maps. As maps are introduced, the first map should be done as a whole group through guided practice. The next step should have students attempting to create the map independently. The following is the order that the maps should be introduced: Circle Map, Bubble Map, Double Bubble Map, Tree Map, Brace Map, Flow Map, Multi-Flow Map, and Bridge Map. One week should be spent introducing each map, so eight weeks will be spent to introduce each of the eight maps. The ninth week should be a review week, where all the eight maps are reviewed.

In conclusion, created in the 1990's by Dr. Hyerle, Thinking Maps are a valuable tool to teach students critical thinking skills. Critical thinking is a big part of the new Common Core State Standards as well as a life-long skill necessary to ensure the success of our students. Thinking Maps support the brain's natural pattern-seeking tendencies and create dynamic visual representations of the eight fundamental thinking skills. Thinking Maps drive the learning process, improve student performance, allow teachers to monitor and gauge student progress, and make information and learning more meaningful.

Appendix:

Introducing Thinking Maps

Questions from Texts, Teachers and Tests	Thinking Processes	Thinking Maps as Tools
How are you defining this thing or idea? What is the context? What is your frame of reference?	**DEFINING IN CONTEXT**	Circle Map 
How are you describing this thing? Which adjectives would best describe this thing?	**DESCRIBING QUALITIES**	Bubble Map 
What are the similar and different qualities of these things? Which qualities do you value most? Why?	**COMPARING and CONTRASTING**	Double Bubble Map 
What are the main ideas, supporting ideas, and details in this information?	**CLASSIFYING**	Tree Map 
What are the component parts and subparts of this whole physical object?	**PART-WHOLE**	Brace Map 
What happened? What is the sequence of events? What are the substages?	**SEQUENCING**	Flow Map 
What are the causes and effects of this event? What might happen next?	**CAUSE and EFFECT**	Multi-Flow Map 
What is the analogy being used? What is the guiding metaphor?	**SEEING ANALOGIES**	Bridge Map 

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INNOVATIVE LEARNING GROUP

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