A Language for Learning

Second Edition

THINKING MAPS®

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Thinking Maps®:
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Acknowledgments

The examples, activities, and anecdotes contained in this manual have been gleaned from the thousands of students, teachers, and administrators who have successfully implemented Thinking Maps in their individual schools and school districts. Their personal experiences and applications have helped to make this manual more "user-friendly." For their invaluable contributions we are truly grateful.

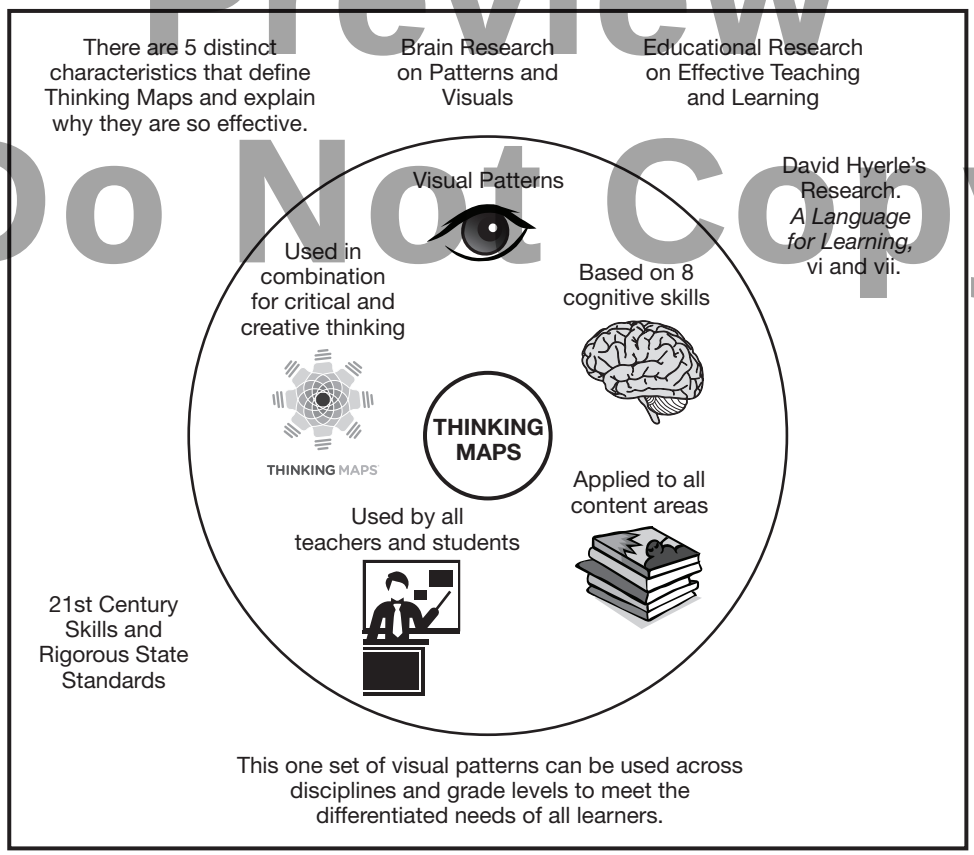
A special "thank you" to the entire Thinking Maps, Inc. consultant team whose time, ideas, and special contributions have helped create a training manual that has certainly been a team effort. Dr. Hyerle, Ms. Yeager, and I gratefully acknowledge the expertise of all who assisted in the creation of this resource manual.

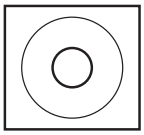
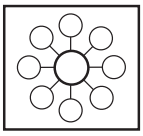
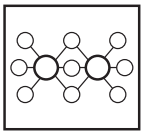
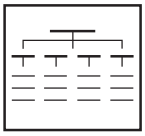
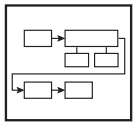
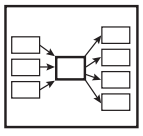
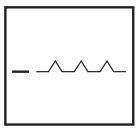
Sherwin Suddreth, President

Definition of Thinking Maps

Guiding Questions: What are Thinking Maps? How do they support critical and creative thinking?

There are 5 distinct characteristics that define Thinking Maps and explain why they are so effective. As a language of eight specific visual patterns, the maps can be used individually and in combination. The effectiveness of using Thinking Maps for critical and creative thinking is based on foundational brain and educational research. This one set of visual patterns can be used across disciplines and grade levels to meet the differentiated needs of ALL learners.



COGNITIVE VOCABULARY	THINKING PROCESSES	THINKING MAPS AS VISUAL PATTERNS
Define, list, tell everything you know, brainstorm, context, relate your prior knowledge, tell about, discuss, identify	DEFINING IN CONTEXT BRAINSTORMING	Circle Map 
Describe using adjectives, describe, use vivid language, observe using the 5 senses, describe feelings, properties, qualities	DESCRIBING	Bubble Map 
Compare/contrast, discuss similarities/differences, distinguish between, alike, same, different, differentiate	COMPARING AND CONTRASTING	Double Bubble Map 
Classify, sort, group, categorize, types of, kinds of, give sufficient and related details, list and elaborate, taxonomy	CLASSIFYING MAIN IDEA AND DETAILS	Tree Map 
Parts of, take apart, show structure, physical components, deconstruct, identify the structure, anatomy	PART TO WHOLE	Brace Map 
Sequence, put in order, recount/ retell, what happens next, cycles, patterns, processes, change, solve multi-step problems	SEQUENCING	Flow Map 
Causes and effects, discuss consequences, what would happen if, predict, identify motives, why, results, outcomes, benefits, if . . . then	CAUSE AND EFFECT	Multi-Flow Map 
Identify the common relationship, guess the rule, interpret symbols, analogies, similes, metaphors, match	SEEING ANALOGIES RELATIONSHIPS	Bridge Map 

Guiding Questions for Constructing a Double Bubble Map

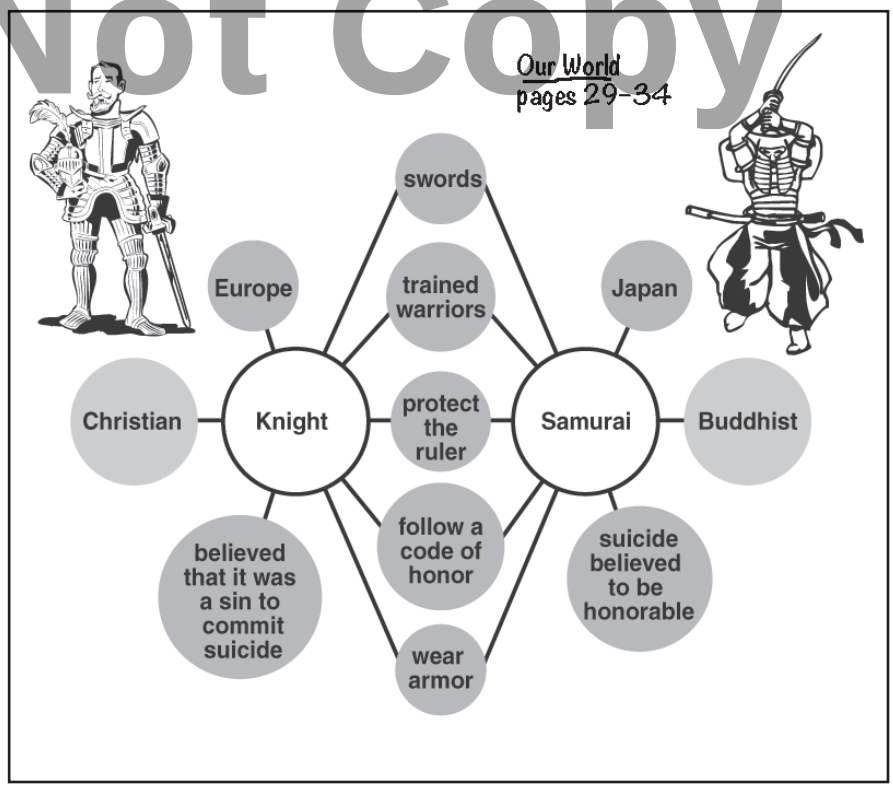
- What are the similarities and differences between these two things?
- How are these two things alike and different?
- Which similarities do you think are the most important?
- Are there any details that are unique to one thing?

Key Words

Compare
Contrast
Similarities
Differences
Distinguish between
Differentiate
Same
Alike
Different

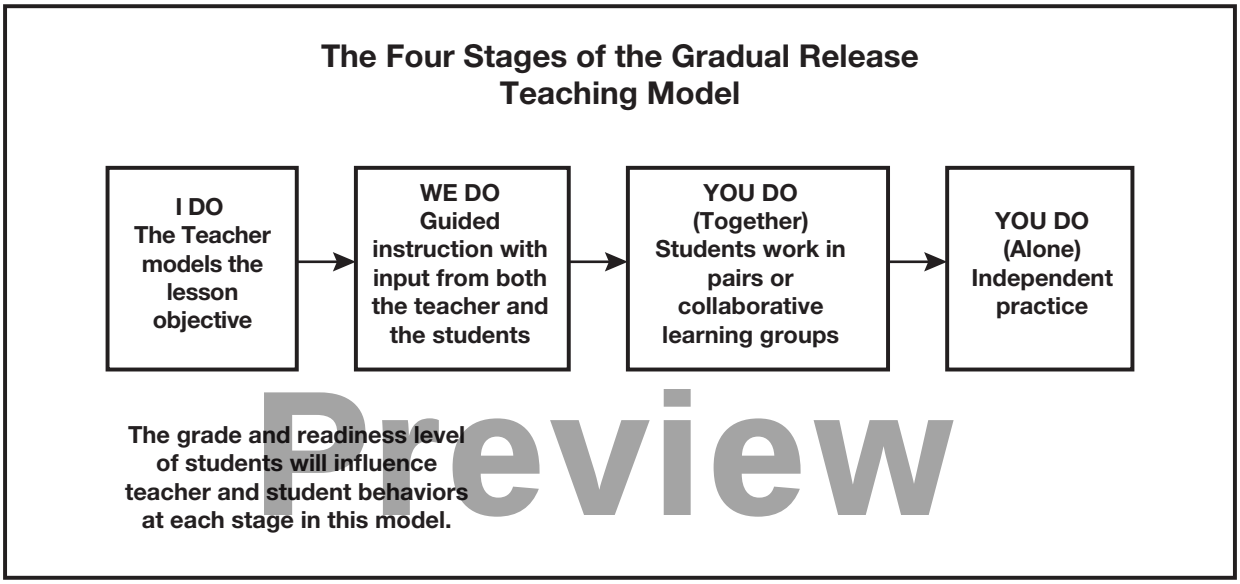
Adding the Frame of Reference to the Double Bubble Map

- How do you know these similarities and differences?
- What source are you using to make these comparisons?
- Is a specific point of view influencing the information you have included in this **Double Bubble Map?**
- What have you learned by constructing this map?
- Why are these similarities and differences so important?



The Importance of the Gradual Release of Responsibility

The Gradual Release Model is a best practice instructional model for teachers to strategically transfer the responsibility in the learning process from the teacher to the students (Fisher & Frey).



While all 4 stages of this model are often present in one standards-based lesson, teachers can use this model for several days during the week assigned to teaching each Thinking Map. Suggestions for successfully releasing the responsibility of the maps to students are listed below.

I DO:

During this initial introduction of each Thinking Map, teachers should focus on (1) the cognitive purpose of the map; (2) the related cognitive language or key words; (3) how the map is drawn; (4) key information and details about the map.

WE DO:

Once teachers have taught and modeled the use of each Thinking Map, it is time for students to become involved in the construction of a map. During this stage, teachers should focus on (1) giving and receiving feedback and (2) using the information in the map as a type of formative assessment.

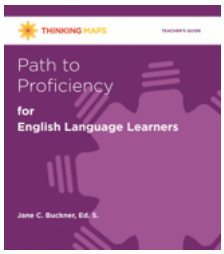
English Language Proficiency

Thinking Maps empower teachers with the tools to address academic and language needs of all learners while maintaining the cognitive rigor required to be successful with standards-based content. Using Thinking Maps for the four language domains of listening, speaking, reading, and writing benefits all students with special needs, especially English Language Learners.

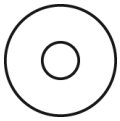
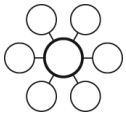
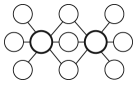
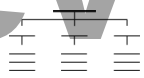
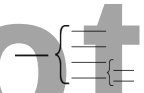
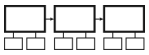
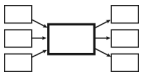
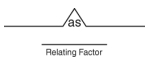
Benefits:

- Thinking Maps allow teachers the flexibility to teach the same content while adapting activities to the level of English **language acquisition** ranging from beginning to advanced.
- Students are encouraged to construct the maps in collaborative teams, allowing English learners an opportunity to practice their **oral language** skills in smaller groups of their peers.
- Language development becomes a natural part of any lesson because students are given an opportunity to read, discuss, and write targeted **academic vocabulary** as they construct their maps.
- **Text structures** are illustrated visually, enabling students to read, take notes, and organize their thoughts for writing and oral presentations.
- Because Thinking Maps are visual patterns, teachers can **see students' thinking** even if they have not mastered the skill of speaking or writing in English.
- The consistent patterns are used in all academic areas so that students develop **ownership** of these tools for **critical and creative thinking.**

Path to Proficiency Advanced Training

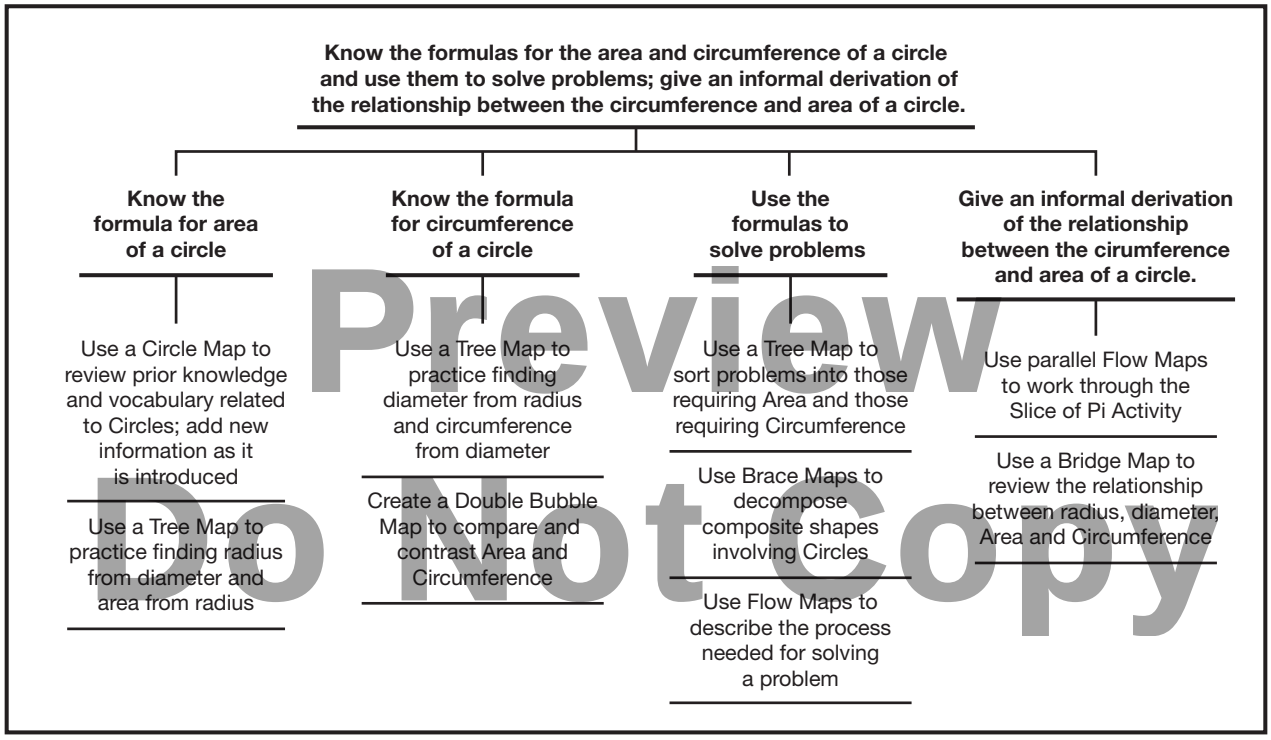


- Addresses both the affective and cognitive dimensions of learning a language
- Demonstrates how Thinking Maps can be used to address the form, function and fluency of language
- Demonstrates instructional differentiation utilizing Thinking Maps
- Shows how to teach language through content so students can achieve Cognitive Academic Language Proficiency
- Addresses all four language domains: Listening, Speaking, Reading, and Writing

QUICK CONTENT CORRELATIONS (CONT'D)		
SCIENCE	**MAP**	**MATHEMATICS**
• Generating prior knowledge about a scientific concept • Searching for context information about a problem • Investigating scientific problems from multiple frames		• Defining a problem in context • Generating possible solutions to a problem • Putting word problems in context
• Describing properties of things • Identifying essential properties of an organism • Establishing criteria (value) for experimentation		• Identifying properties of numbers • Describing attributes of geometric figures • Establishing criteria for evaluation
• Comparing and contrasting properties of things • Comparing different systems • Comparing results from changes during experiments		• Comparing attributes of numbers • Comparing geometric figures • Evaluating alternative problem-solving approaches
• Creating categories (taxonomies), grouping items • Applying deductive and inductive reasoning • Organizing information during research		• Grouping types of numbers according to attributes • Classifying types of geometric figures • Sorting types of information in word problems
• Identifying whole-to-part relationships • Analyzing the anatomy of organisms • Creating new physical structures		• Analyzing spatial relationships • Identifying fractional references • Analyzing geometric figures
• Following directions in a scientific experiment • Logically organizing and prioritizing data • Analyzing the physiology of organisms		• Sequencing and ordering numbers • Following order of operations and steps • Reading and creating computer flow charts
• Analyzing cause(s) and effect(s) of events • Hypothesizing and predicting outcomes • Analyzing feedback in dynamic settings		• Following "if–then" propositions • Identifying causal relationships in word problems • Tracing causes and effects during problem solving
• Learning abstract concepts by analogy • Thinking relationally for creative problem solving • Inventing using analogical thinking		• Applying analogical reasoning • Solving problems using ratios and fractions • Using analogies for finding and solving problems

Step Three: Task Analysis and Thinking Map Connections

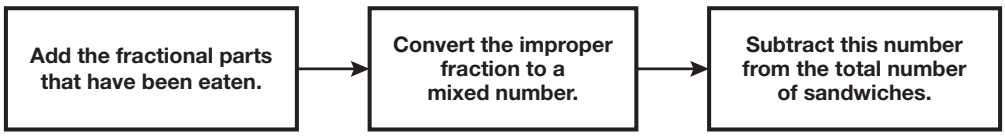
After deconstructing the standard in the **Tree Map,** the next step is to add details to each part of the standards—to analyze each task. This step is critical to integrating Thinking Maps seamlessly into your lessons. Having students create related Thinking Maps should cause them to not only make the map but to **make meaning.** Remember to choose the Thinking Map needed to teach the standard. The details in this **Tree Map** provide suggestions for maps to use for each part of the standard.



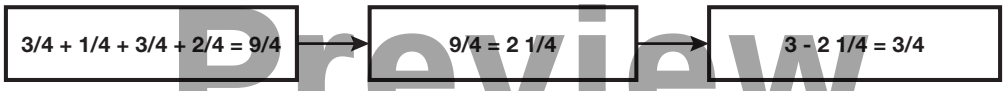
Assessments should be developed based on the information in the **Tree Map** and the Frame of Reference.

Step Three (or Four): Create Parallel Flow Maps (Explain Your Thinking)

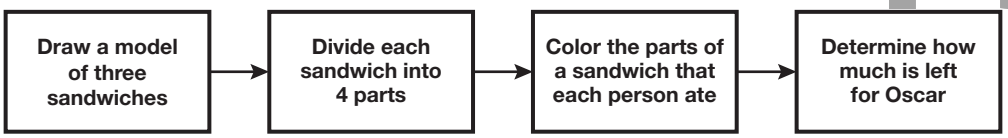
Students can either first explain their thinking or show their work by solving the problem one step at a time. Either way, students need to complete both sequences. For this specific problem, students might explain their thinking in words like those in the **Flow Map** below.

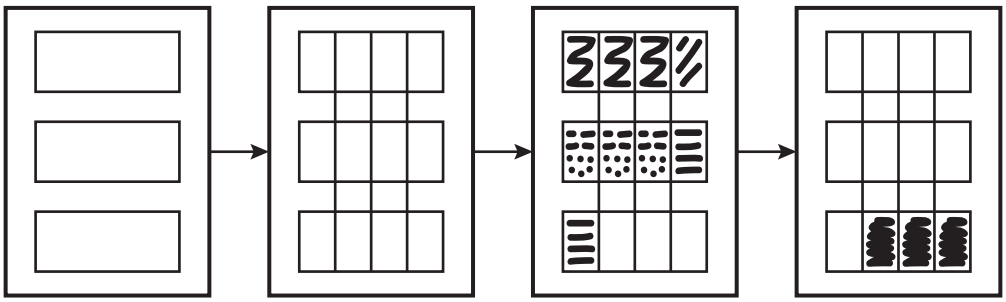


Step Four (or Three): Create Parallel Flow Maps (Show Your Work)



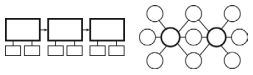
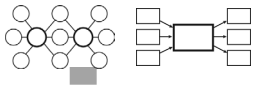
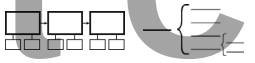
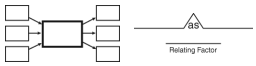
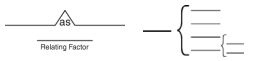
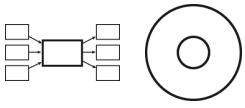
Extension: Ask students to think of another way to solve the problem.





Connecting Thinking Maps and Science Crosscutting Concepts

The following table provides suggestions for connecting Thinking Maps to the NGSS Crosscutting Concepts. *The Thinking Maps listed are identified as general connections and should not be seen as the only maps that could be used to help students' thinking about science concepts.

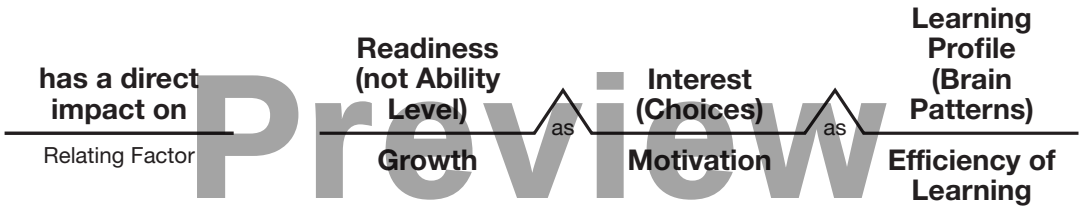
Crosscutting Concepts in Science	Critical Questions	*Possible Thinking Maps®	*Standards-Based Connections
Patterns	Is there a pattern? What caused the pattern? What predictions can I make? How does this pattern compare to others?		Flow or Bridge Maps for analyzing patterns Tree Map for classifying Bridge Map for relationships Multi-flow Map for causes of patterns and making predictions Double Bubble Map for comparing/ contrasting (C/C) patterns
Cause and Effect	What evidence is there for this cause and effect (C/E) relationship? What are other possible causes? How is this C/E relationship similar to others? How does changing one event affect the results?		Multi-flow Map for C/E Partial Multi-flow Map Circle Map for Brainstorming Double Bubble Map for C/C
Scale, Proportion, Quantity	How does this system look at a smaller or larger scale? What is new and what is the same? How does this scale relate to you? What happens if we change the quantity involved?		Multi-flow Map for C/E Tree Map for details at different measures Double-Bubble Map to C/C systems Brace Map for analyzing parts at different scales or proportions Bridge Map for relationships
Systems and System Models	What parts and sub-systems make up this system? What interactions and processes involve this system? How is this system alike or different from others? What are the effects of modifying one part of the system?		Brace Map for taking systems apart Flow Map for organization of the system Double-Bubble Map to C/C systems Multi-flow Map to analyze impact of modifying systems
Energy and Matter	How are energy and matter related in this system? Where does the energy for this system come from? Go?		Flow Map for tracking energy Partial Multi-Flow Map for effects of changes Bridge Map for relating energy and matter Partial Multi-flow for causes of energy
Structure and Function	How does the function depend on the structure? Are there other structures that serve the same function?		Brace Map to analyze structure Bridge Map to show relationship of structure to function Partial Multi-flow Map to explain how the structure causes the function Double Bubble Map for C/C different structures
Stability and Change	What causes change in this system? Stability? Is the stability static or dynamic? What are possible catalysts for changing the stability?		Partial Multi-Flow Map for C/E of change Circle Maps for defining dynamic and static stability Flow Map for evolution of a system Double Bubble to C/C dynamic and static stability

Differentiation and Thinking Maps

Differentiation is a way of thinking about teaching and learning. Meaningful and rigorous teaching and learning are both grounded in differentiation. Understanding how the brain makes sense of the world is a complex, individualized process. No one learns and processes information in the same way. Applying this concept to teaching and learning is often overwhelming.

The following pages provide natural ways for teachers to incorporate the philosophy of differentiation into lesson planning.

Lessons can be differentiated based on student readiness, interest, and/or learning profile. This **Bridge Map** shows how differentiation can impact growth, motivation, and efficiency of learning.



Thinking Maps are visual patterns for critical and creative thinking for ALL LEARNERS. Learning how to differentiate with Thinking Maps can be done in a variety of ways.

If teachers use Thinking Maps effectively, differentiation becomes a natural part of every lesson. Natural differentiation happens when:

1. Students construct their own Thinking Maps and do not just fill in black line masters. Drawing a map on a blank sheet of paper allows students to show what they know and allows them to individualize their maps.
2. Students use their own words when they construct their maps; so, they use vocabulary that matches their own language development.
3. While Thinking Maps are visual, they should be developed collaboratively, allowing students to discuss and explain their thinking to others.
4. Thinking Maps can be constructed in a variety of ways, including using technology, paper and pencil, with manipulatives, or even kinesthetically.
5. Once students master the maps, they can choose whichever map or maps they want to use to show their thinking.