Integrating Thinking Maps into the Fourth Grade Curriculum

Master's Project
Submitted by
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EDU 690

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Introduction

Since obtaining my certification in 1995, I have been a fourth grade teacher with the Syracuse City School District. With that comes the responsibility and pressure of preparing students for the New York State assessments. These assessments serve to measure our school's instructional programs. Unfortunately, our school's scores have traditionally been low. Our school has tried many different approaches to boost student achievement, and we're always looking for new innovations and strategies.

In May 2000, I was introduced to a new concept that the Syracuse City School District wants to systematically integrate into all of our schools at all grade levels. This approach, "Thinking Maps", is a set of eight specific visual tools used to correspond to the eight basic thought processes; defining in context, compare and contrast, describing, showing relationships, sequencing, whole to part, cause and effect, and analogies and metaphors.

The term "Thinking Maps" and their graphic forms, are the registered trademarks of the Innovative Learning Group of Cary, NC. They were developed by Dr. David Hyerle who holds the title of Director of Curriculum and Professional Development with the Innovative Learning Group. Dr. Hyerle has written many books on the subject of "visual tools" and their effectiveness to help facilitate the learning process and strengthen instructional programs. This has been proven through the implementation of Thinking Maps in many school districts around the country who have increased test scores and overall student achievement considerably.

As I attended the workshop in early May of 2000, I was impressed with student writing and other work samples that were created as a result of other SCSD teachers

using these "Thinking Maps" in the classroom. One example that sticks out in my mind is the second grade teacher who had his students writing well organized four to five paragraph essays (each paragraph was at least two sentences) on famous African-Americans. Another example was the pre-kindergarten teacher who had her inclusion class making flow charts on the growth process of plants. I was so impressed; in fact, that I felt our students could possibly benefit from this innovative teaching tool by helping them to become more proficient writers, readers, and critical thinkers.

In order for a school to get the training needed to implement the program, 80% of the staff would have to commit to using these tools. The workshop I attended was meant as an introduction for two teachers per building who would then try to "sell" the idea to other staff members. I was part of the team that introduced the idea to building staff at a faculty meeting in early June of 2000. Many staff members were interested in learning more, however training would have to wait until March 2001.

For purposes of this project, through the support of administrators, I was able to attend another school's preliminary training in late June of 2000. I soon began planning over the summer for the next school year. Because of my known interest and enthusiasm in Thinking Maps, my vice-principal asked during that summer if I would be interested in attending the Thinking Maps workshop to become a trainer. Of course, I jumped at the chance. Not only would I receive more training for my own purposes, but also I could support my colleagues in the building once they were trained. I received the first two days of the "training for trainers" during August of 2000, and additional days throughout the school year.

Literature Review

Maps are a primary part of our lives. Take a trip by car and one is well advised to bring a map. Visit a city, museum, or theme park, and try to get along without one. We watch the evening news for a check of the weather map. Try taking the subway without consulting the diagram. As a teacher, try to teach geographic relationships without a map. While using these visual models, we make connections between key representations and ideas or concepts.

In the arena of education, an exciting variety of maps, or visual models, are being used to help students connect information and find patterns and relationships. A confusion of terms and definitions has developed, however, and these names have been used synonymously: webs, mindmaps, concept maps, and more recently, semantic maps and graphic organizers.

The best definition of graphic organizers is found in the book called Patterns of Thinking (1991) by John Clarke. This text gives the most comprehensive research base on visual tools. Clarke defines graphic organizers as:

> ...Words on paper, arranged to represent an individual's understanding of the relationship between words. Where as conventions of sentence structure make most writing linear in form, graphic organizers take their form from the presumed structure of relationships among ideas (1991, p.30).

Semantic maps are designed to display information graphically within categories related to a central concept (Heimlich and Pittelman, 1986). These types of organizers are used in a variety of situations and are particularly helpful for reading comprehension. Reading with the appropriate graphic structure can help students

select and find important ideas and details as well as detect missing information and unexplained relationships (Hunter, Jones, & Pierce, 1989).

The most recent development in visual tools is called "Thinking Maps" (Hyerle, 1995). Developed by Dr. David Hyerle, and based upon the initial research of Dr. Albert Upton (1960), Thinking Maps are eight specific visual tools that correspond to eight fundamental thought processes in the human brain. The eight Thinking Maps can be used individually or in combination to form a common visual language for students and teachers, and can be used with pre-kindergarten students to postgraduates. The eight maps are circle map (define in context), bubble map (describes), double bubble map (compare and contrast), tree map (show relationships), flow map (sequencing), multi-flow map (cause and effect), brace map (whole to part), and bridge map (analogies and metaphors).

With all the different types of maps, webs, and organizers available, inconsistent use and lack of clear definitions may be confusing students' thinking rather than improving it. With Thinking Maps, Hyerle claims there are five essential characteristics that set them apart from the rest:

> ".... Consistency of graphics, flexibility of forms, developmental, integrative and interdisciplinary use, and reflectiveness of these tools together make them worthy to be called a language for learning" (Hyerle, 1995).

Thinking Maps are usually introduced on a school wide basis. This is so that the "new language" is integrated into the learning environment. This whole-school training supports consistent, flexible, and developmental use of Thinking Maps for integrating individual, cooperative, and school wide learning. The whole school faculty is trained over the course of a year beginning with one full day of training. Once

students are introduced to each map, they are coached by teachers on how to apply the Thinking Maps to content specific and interdisciplinary learning. Students soon learn to use the Thinking Maps on their own, and with a whole school using them, a common visual language for learning is being utilized.

Thinking Maps have been shown highly successful in over 300 school districts nationally as demonstrated by standardized test scores and improvement in holistic writing scores (Hyerle, 2000). In Catawba County, North Carolina, all schools were trained between 1993 and 1998. Fourteen schools received "exemplary" status from the state, and five of these received "Schools of Distinction" status. In one school, writing scores rose from 33% to 68% from 1993-1998 (Hyerle, 2000). Similar results are shown in Hyerle's book *A Field Guide for Using Visual Tools* (Hyerle, 2000). With so many success stories to relate, Thinking Maps may be the current innovation school districts are looking for in order to increase test scores and overall student achievement.

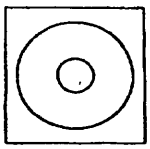
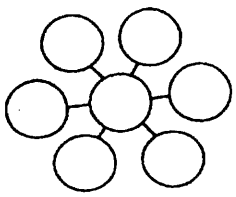
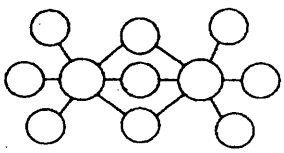
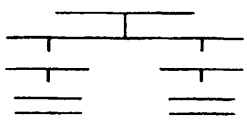
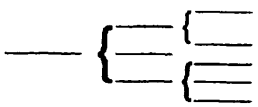
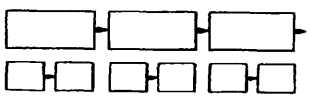
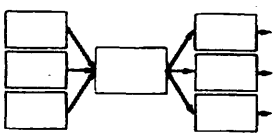
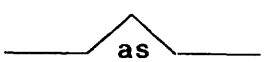
Methodology

Since I was so impressed with Thinking Maps, I knew I had to develop a project around it. My first inclination was to prove that test scores could be elevated using Thinking Maps. Since that has already been proven in other school districts, I preferred to develop constructive and meaningful ways to integrate Thinking Maps into the fourth grade curriculum. Hopefully, this project will support other teachers interested in integrating Thinking Maps into their curriculum.

I had also been given the opportunity, due to my known enthusiasm, to become a "trainer" for Thinking Maps. I have been through six days of additional training, along with two other colleagues, in order to support newly trained teachers in my building. Our team of three has so far been successful in generating enough enthusiasm to get our staff interested in the process. Most teachers, as well as teaching assistants, have been trained and are using Thinking Maps on a regular basis. Our support team publishes weekly memos and has a support meeting every other week. Walking around our building, one would find an array of maps hanging everywhere. There is even an "interactive" area where passersby may add to a map on a particular subject.

In preparation for the upcoming school year, I used Thinking Maps in planning my fourth grade curriculum for the entire year. It's usefulness in long term planning helped me to see the big picture. Since our district curriculum guides are outdated, I used the New York State Learning Standards and Core Curriculum Guides as guidelines. I followed David Hyerle's suggested outline for introducing Thinking Maps to students one map at a time over the first eight weeks of the school year. As each week went by, I incorporated that week's map into another area of the curriculum.

Students really caught on and have been using them ever since for a variety of purposes. What I have to share here will hopefully help other teachers by demonstrating how easy and versatile Thinking Maps are to use and implement into any program.

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 

Notes

The easiest way to start using Thinking Maps in your classroom is to follow the "MY STORY" prompt in the blue manual. You can build from there.

Use masters of Thinking Maps 1 or 2 times only. After that let students create their own. This keeps their use flexible.

Use Thinking Maps in your own planning either long term or short term.

Using the FRAME of REFERENCE helps the learner identify those things that influence their beliefs, values and experiences. In other words, the "HOW" in what the learner knows. However, the FRAME may be omitted. With a Circle Map, the FRAME can hold questions the learner would like answered (like in a K-W-L).

The Circle Map should be used for brainstorming. When using the Bubble Map, it can look like a "web" or "mind map" that is used in brainstorming. Be careful that only adjective and adjective phrases are being used in the Bubble Map. This will help in vocabulary development and descriptive writing.

Concerning the Signatures reading series, any of the graphic organizers suggested may be replaced with aThinking Map. Also, some of the workbook pages can be converted to a Thinking Map. For example, a page on word analogies can be converted to a Bridge Map.

Thinking Maps can be used as a daily review. Many times, I have a partial map on the white board so students can add or complete it. We go over it when we have a couple of minutes to fill during the course of the day.

Language Arts Ideas Using Thinking Maps

Circle Map

- Brainstorming
- Prior Knowledge and frame for "how" you know it
- K-W-L with questions in frame
- Pre-writing activity
- Pre-reading
- Vocabulary Building
- Phonics
- Note taking
- Making inferences

Bubble Map

- Character map
- Vocabulary building (synonyms/antonyms)
- Pre-writing activity

Double Bubble Map

- Compare/contrast two characters
- Prioritize main characteristics
- Pre-writing activity

Tree Map

- Identify main idea, supporting ideas, details
- K-W-L
- Writing a news article (who, what, when, where, why, how)
- Story mapping (character, setting, plot, problem, solution)
- Pre-writing activity (organizing topics and details) or note taking
- Writing a summary or character sketch

Flow Map

- Story sequence (beginning, middle, end)
- Comic strip creation
- Sorting spelling words
- Chapter summary
- Organizing a speech
- Pre-writing activity (paragraph sequencing)
- Showing climax in a story
- Narrative writing

Multi-Flow Map

- Analysis of problem/solution
- Cause and effect analysis
- Pre-writing activity (persuasive writing)
- Predicting story outcomes
- Goal writing
- Conflict resolution in stories

Bridge Map

- Phonics
- Vocabulary (synonyms, antonyms, homophones)
- Understanding analogies, metaphors, and similes

Brace Map

- Physical settings in stories
- Pre-writing activity of a technical nature

Integrating Thinking Maps into the Signatures Series
Rare Finds - Grade 4

Theme 1- *Guiding Your Way*

"Mandy Sue Day"

1. Start with individual **Circle Maps** with "Things to do on a day off".
   Students will do a quick write from that map. (T-18)
   Share maps and written pieces.
   Whole group to complete a large **Circle Map**.

2. Go over vocabulary words. Use a **Tree Map** to categorize words as places, actions or things. (T-19)

3. Use a **Brace Map** to teach parts of a book. (T-29)

4. Students may use a **Circle Map** during reading to jot down unknown words or concepts for discussion later.

5. Students can create a **Bubble Map** about Mandy Sue and write a paragraph about her.

6. Create a **Double Bubble Map** of Mandy Sue's day off. What causes her to get a day off? What are the outcomes of her day off?

7. Students can create a comic strip retelling of the story using a **Flow Map**. (T-43).

8. Use a **Brace Map** to teach parts of a horse. (Writer's Magazine pg. 2 and 3)

9. Use a **Bridge Map** for finding synonyms for vocabulary words. (T-19)

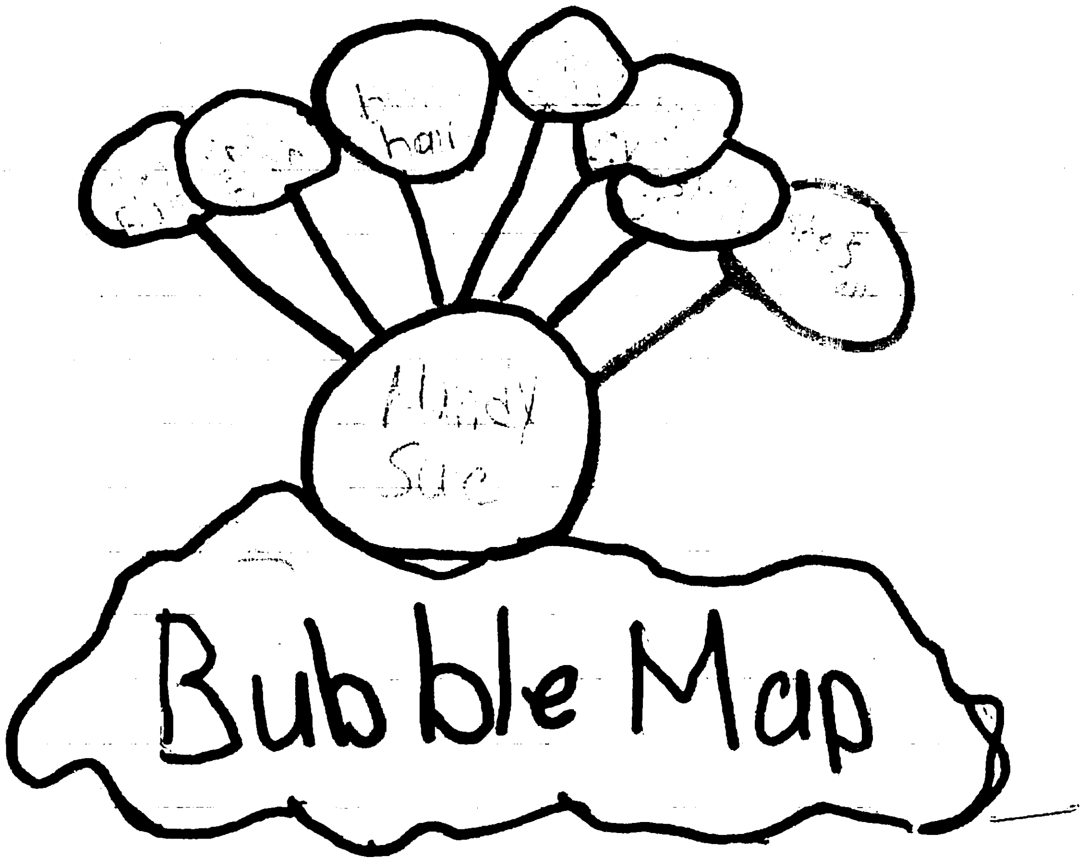
10. Sort spelling words using a **Tree Map**. (T-50)

11. Create a **Double Bubble Map** to compare/contrast yourself with Mandy Sue. Write about those similarities and differences.

12. A **Multi-Flow Map** can be used to show the things that contribute to a day off and what the effects of having the day off might be. Students may even want to set a goal/plan for their ideal day off. Extend into a written piece by using a **Flow Map** to write a narrative about your personal "Day Off". (T-46) Assessment for this activity can be shown on a **Tree Map**. (see "Benchmarks" on T-47)

"Mandy Sue Day"

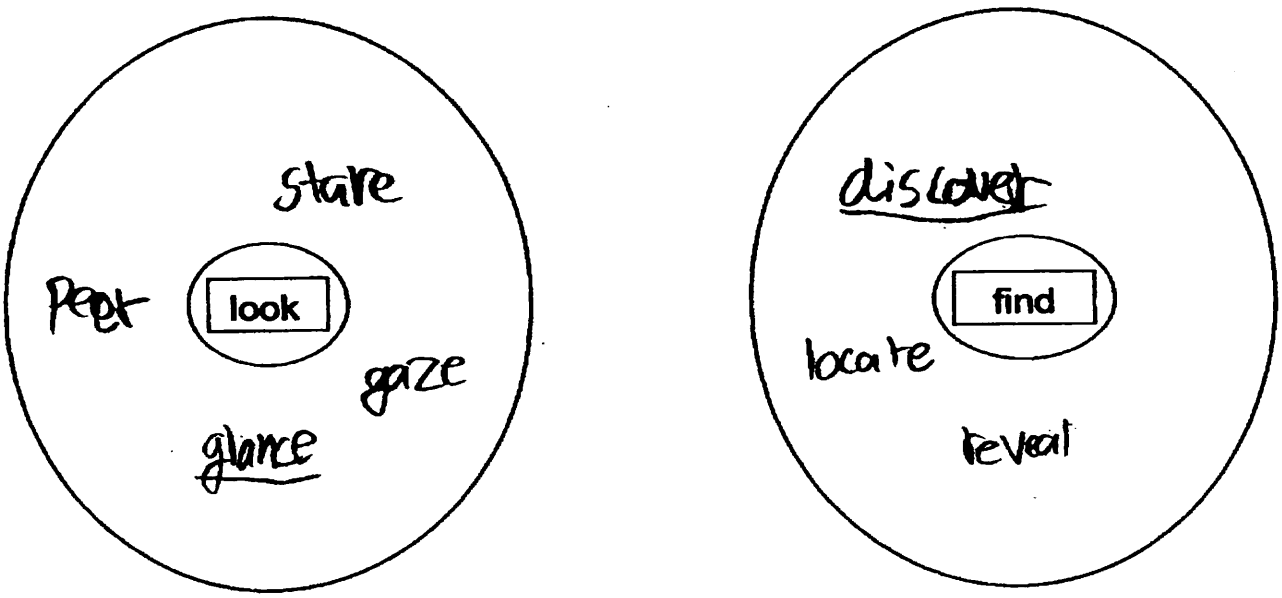
Mandy Sue is [illegible] because she can do alot by herself. She's brave because she can ride a horse on her own. She [illegible] blue eyes and [illegible] hair. She's important because [illegible] trustworthy [illegible]. She's kind because she [illegible] are [illegible] her own [illegible] blind.



Bubble Map and written piece for "Mandy Sue Day"

NAME Kenny SYNONYMS

The words in the box are synonyms for the words in the circle maps. Write each word in the correct circle.



peer	glance	locate	gaze	stare	discover	reveal

Write a sentence that uses a word from each circle. Underline the words.

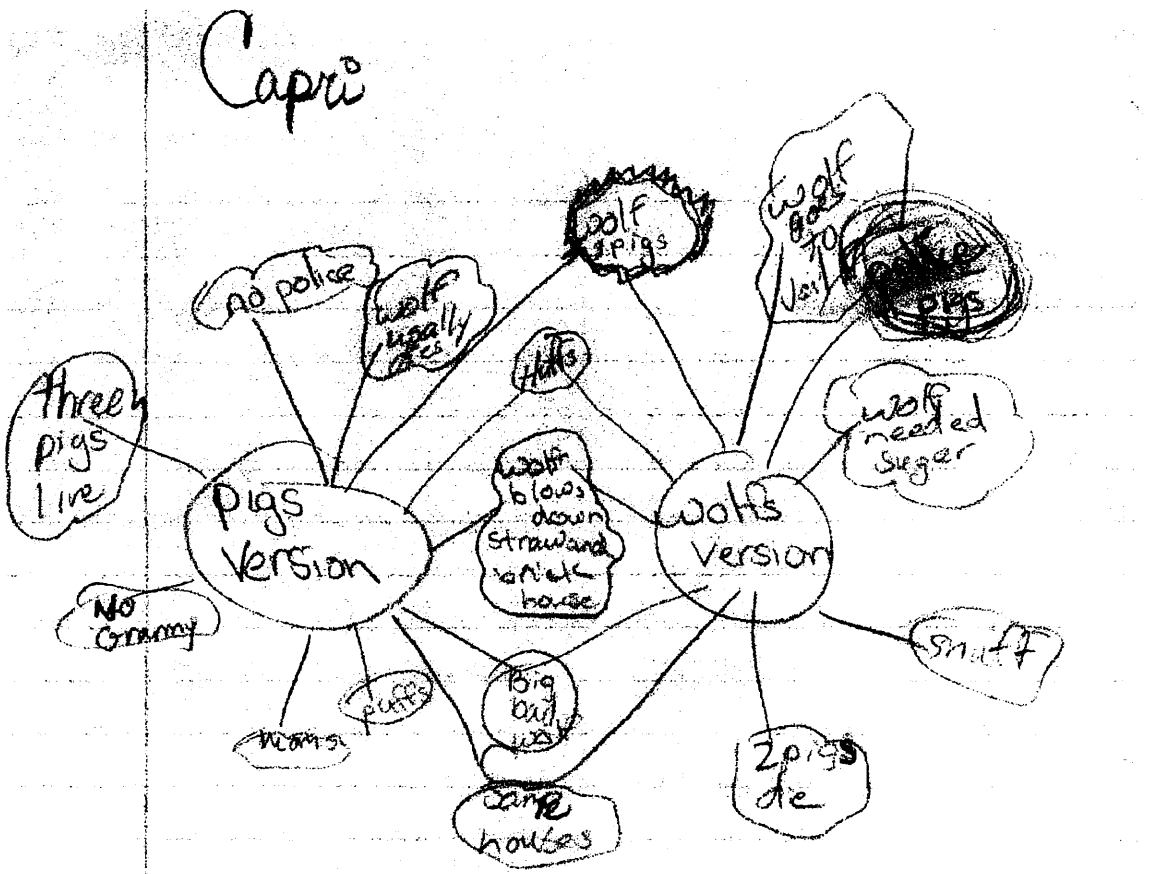
I discover a pencil in the bathroom.

I glance over there then here.

Can you think of any other synonyms for "look" and "find"?

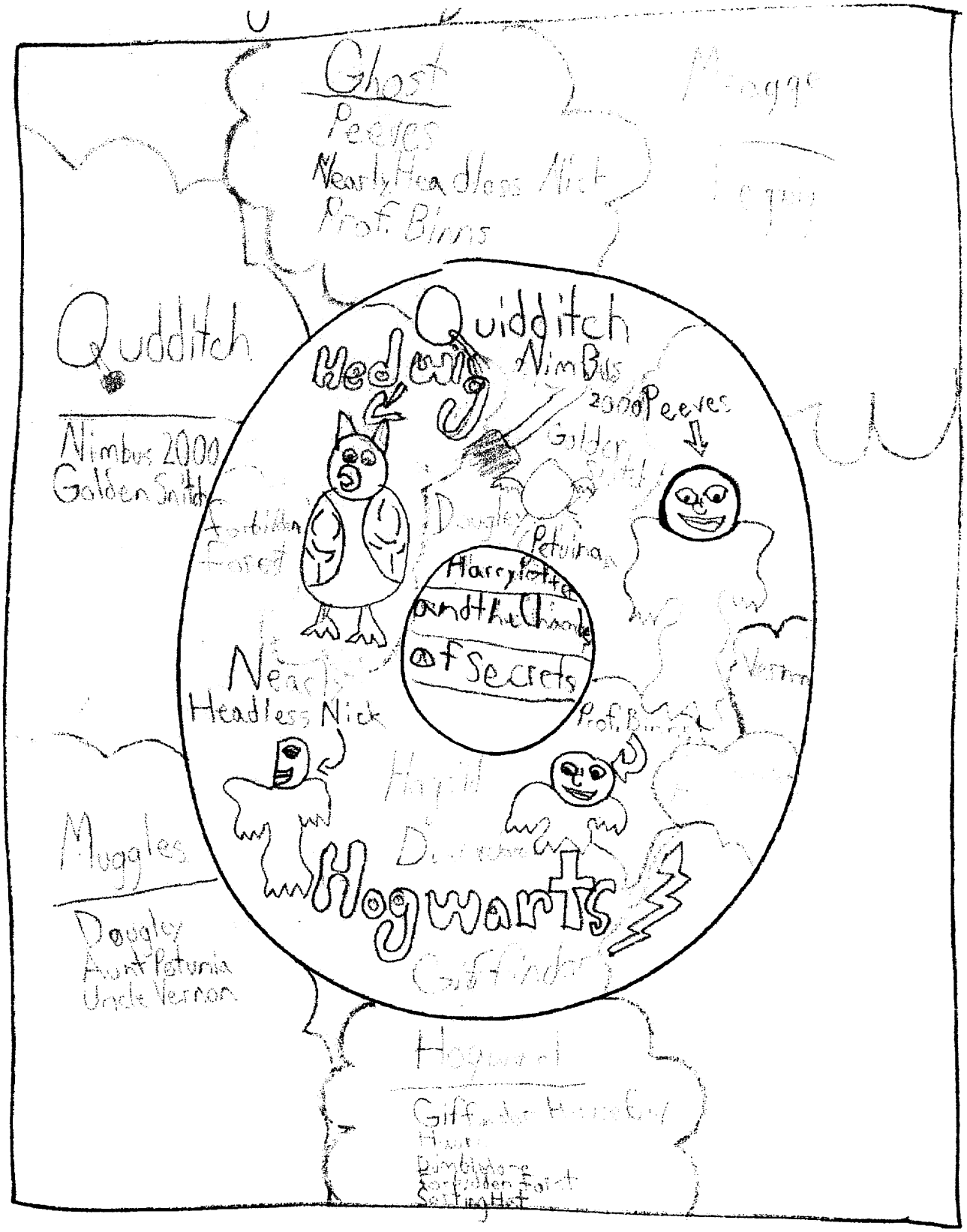
See Search

Working with synonyms

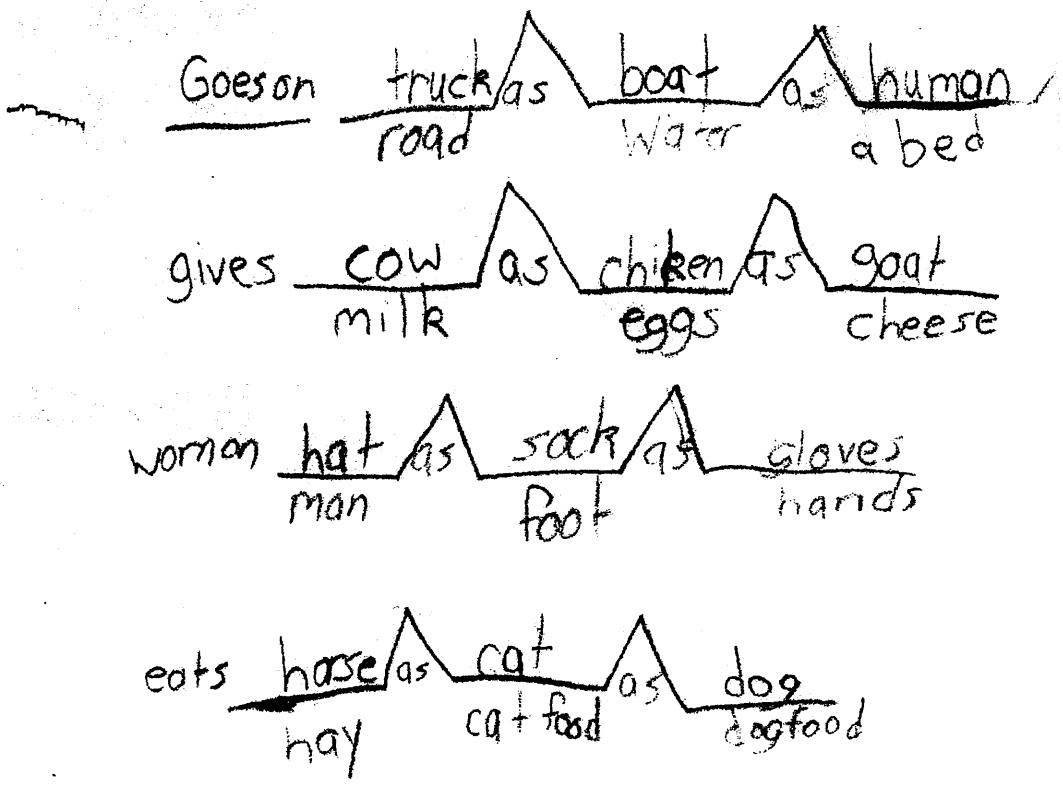


I belive the pigs because all the Sudden the wolf just comes up with a story his self. And I don't think wolf eat suger. How did he huff and snuff and sneeze at the same time. The wolfs lieing big time. Anyway the pigs had there story out longer. I Also support the pigs who are you going to belive 3 pig era wolf who eats Animals.

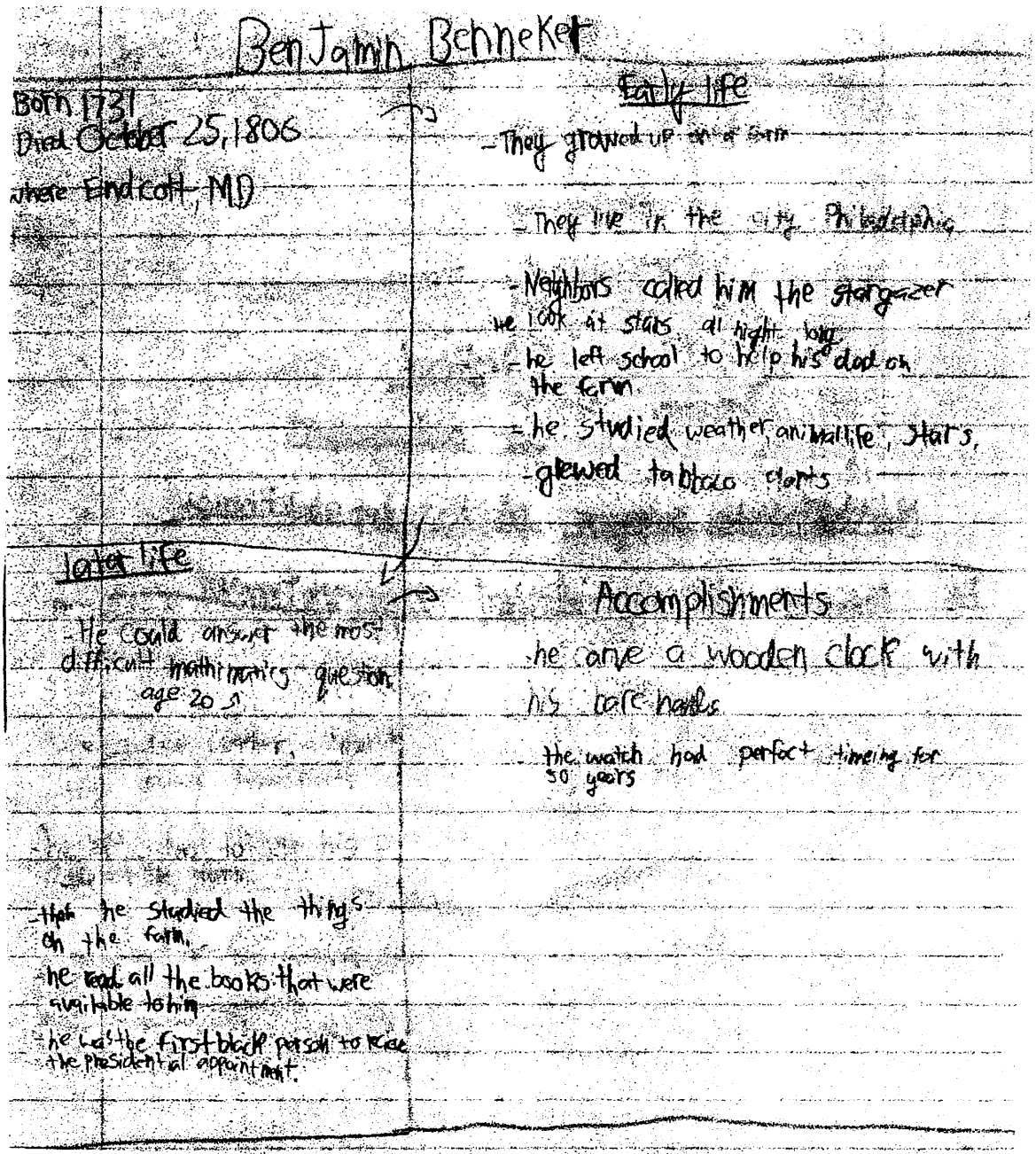
Who do you believe: the pigs or the wolf?



A student brainstorming about a Harry Potter book.
He was starting to organize the information within the frame.



Adapted from the *Signatures* practice workbook pg. 81



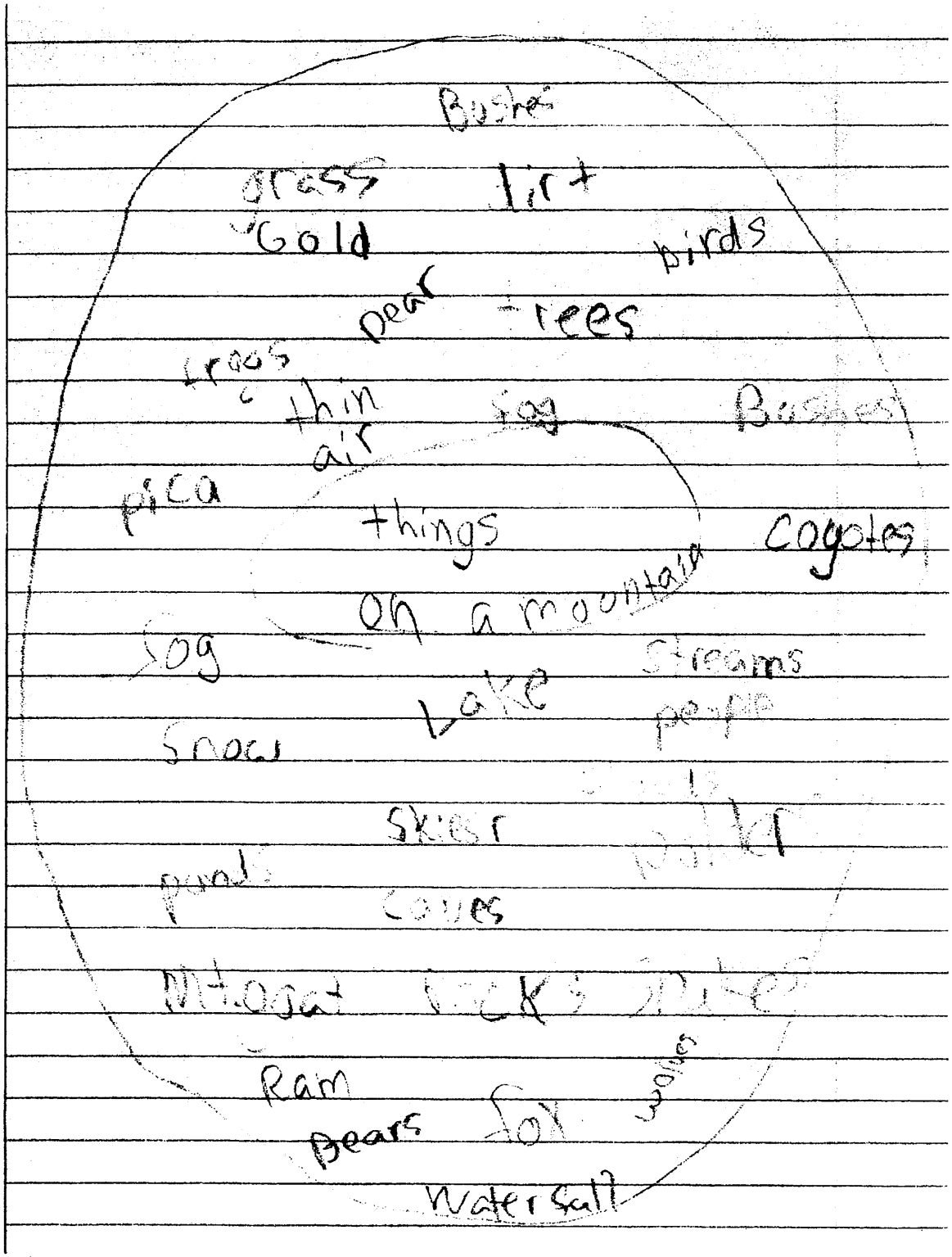
Famous African-American Report
Student uses a Flow Map to take notes

Benjamin Banneker
"Stargazer"

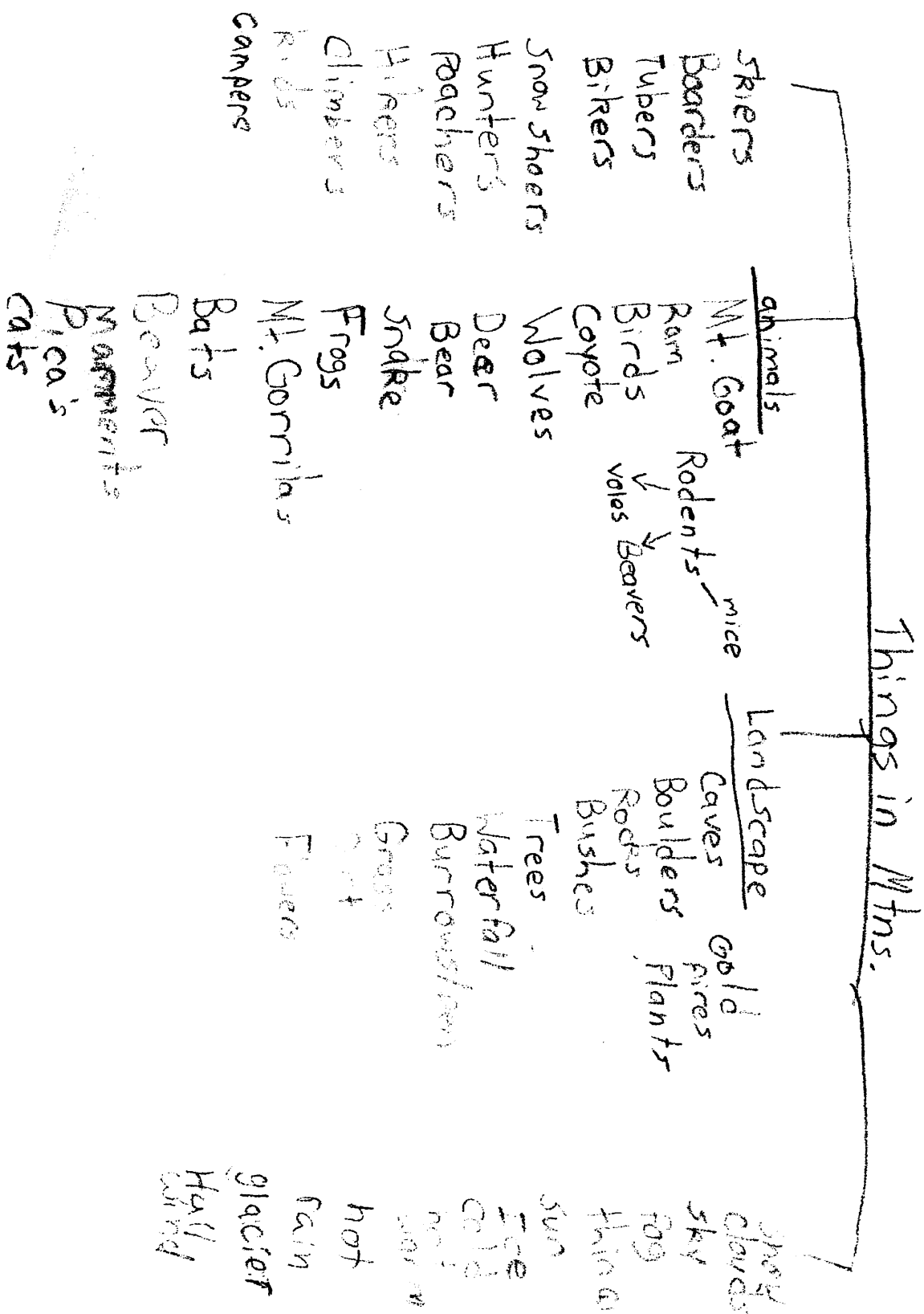
Benjamin Banneker was born in the year of 1731 . His sister's name was Mary. They both grew up on a farm in the city of Philadelphia. When he was young, Banneker used to look at the stars all the time. His neighbors called him "The Stargazer". He left school to help his dad on the farm. They grew tobacco plants on their farm. His dad's farm was his classroom and he studied weather, animal life and stars.

When he was the age of 20, he could answer most difficult mathematics, science, and philosophy questions. He read all the books that were available to him. When he got older he received the Presidential Appointment . When he was younger he carved a wooden clock with his bare hands . The clock had perfect timing 50 years.

The final written piece from notes taken on a Flow Map



Brainstorming before reading "Sierra" in *Signatures* Theme 3



Classifying the information on mountains from the Circle Map to the Tree Map

Social Studies Ideas Using Thinking Maps

Circle Map

- Prior knowledge and frame for "how you know it.
- Note taking
- Pre-writing for reports
- Pre-reading
- Identifying key concepts
- Making inferences

Bubble Map

- Describing key characteristics of famous people, cultures, historical periods, places, regions

Double Bubble Map

- Compare/contrast two political candidates
- Similarities/differences of two cultures, countries, regions
- Compare/contrast key vocabulary
- Compare/contrast past and present

Tree Map

- Note taking for reading and writing reports
- Classifying NYS natural resources
- Classifying continents and countries
- Classifying regions of the U.S.
- Analyzing different forms of government
- Three branches of government
- Iroquois Confederacy hierarchy

Flow Map

- Historical timelines (stages and substages)
- Building the Erie Canal
- Note taking for reading and writing reports

Multi-Flow Map

- Analyzing causes and effects of the Revolutionary War
- Predicting outcomes

Bridge Map

- Matching states with capitals, two letter state codes, or their regions
- Matching continents with countries
- Comparing historical relationships
- Analyzing historical concepts past to present

Brace Map

- Natural boundaries (continents, regions)
- Man-made boundaries (countries, states)
- Geographical terms
- Parts of a Longhouse

Integrating Thinking Maps into the Social Studies Curriculum
Geography – Grade 4

1. Use a **Circle Map** (individual to whole group) -
   "What do you know about the Earth?"

2. Use a **Brace Map** to break down parts of the Earth (land/continents and water/oceans).

3. When discussing continents, use a **Tree Map** to categorize them. Assign each group or pair of students a continent. Students can search maps to list countries/regions/territories on their own branch. To further extend this activity, each continent branch can be further branched off to show bodies of water, points of interest, and major cities. Bring branches together to form a much larger **Tree Map** of the earth.

4. Have students work in pairs to create a **Bubble Map** of the climate or landforms of a continent. Put pairs together to create a **Double Bubble Map** to compare/contrast using attributes and facts. Extend into a written piece.

5. Regions of the U.S. can be classified using a **Tree Map** as in **#3**.

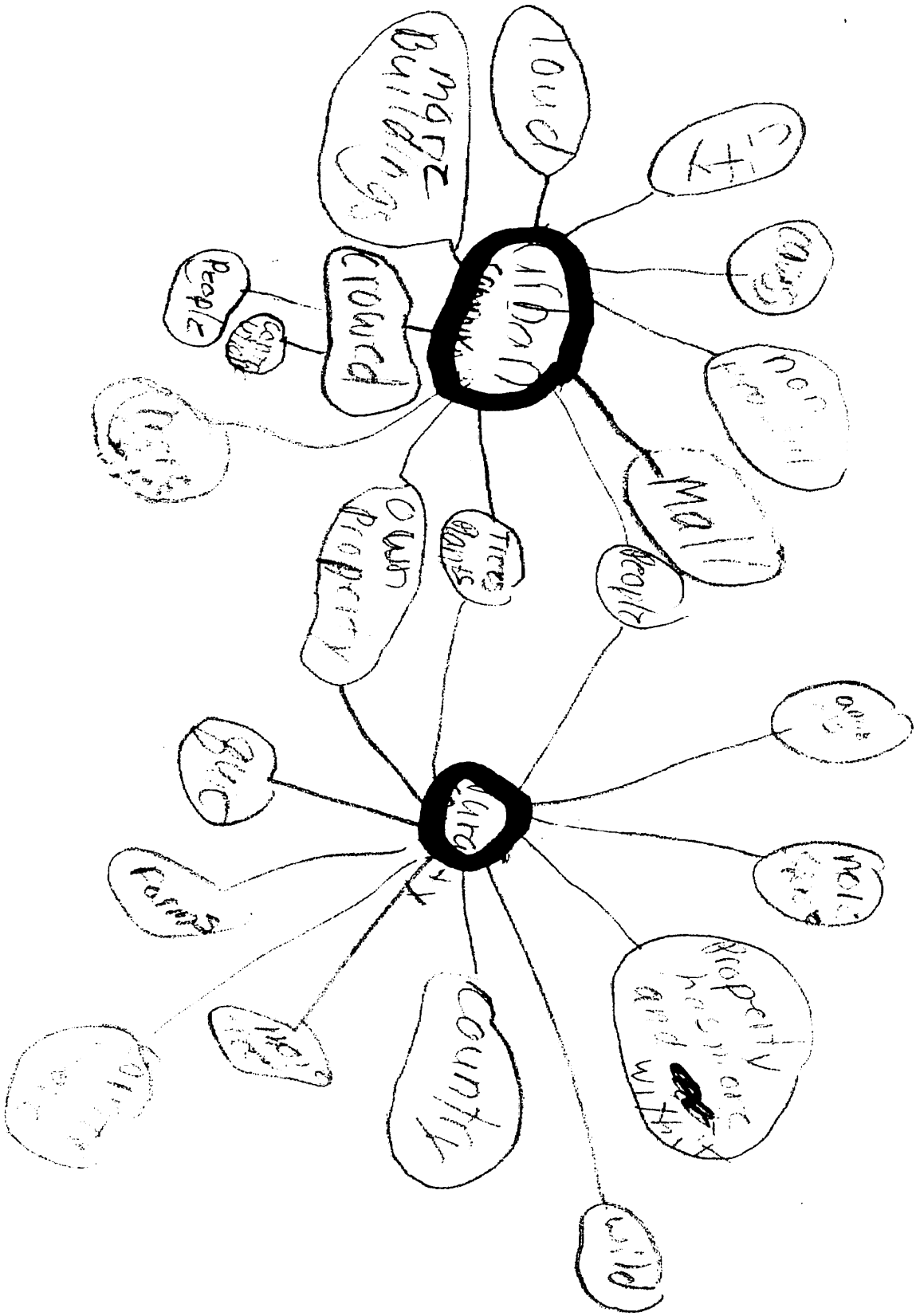
6. A **Flow Map** may be used to show the progression of territorial breakdown. (ex. N. America – U. S. – Region – State – County – Town – City – Village)

7. **Bridge Maps** can be used to show how continents, countries, regions, states and/or capitals relate to each other. (Ex. Albany is the capital of New York, which is in the NE Region of the U.S.)

8. Use the **Multi-Flow Map** to show how land is formed. When discussing New York State for instance, glaciers that formed were instrumental in shaping the land. Students can use the information in *Heath Activity Text* pg. 17 on *Shaping the Land* (shown on next page).

9. Use **Double Bubble Maps** to compare/contrast two states, regions or countries with students using maps, almanacs and encyclopedias for information. Can start as an independent activity and then students pairing up. Extend to a written piece.

Classifying information from the Circle Map to the Tree Map



Comparing and Contrasting urban and rural communities using a Double Bubble Map

Mathematical Ideas Using Thinking Maps

Circle Map

- Fractions (mixed or improper)
- Money
- Factors/Multiples
- Prime Numbers
- Days in a month
- Odd/Even numbers
- Geometric shapes
- Temperature

Bubble Map

- Describing geometric shapes
- Describing numbers

Double Bubble Map

- Compare/contrast geometric shapes (trapezoid and rhombus)
- Compare/contrast parallel and perpendicular lines
- Compare/Contrast congruent and similar shapes
- Tally or survey

Tree Map

- Units of measurement

Flow Map

- Steps to solve a problem
- Steps to follow for division
- Steps to finding average
- Sequencing and ordering numbers

Multi-Flow Map

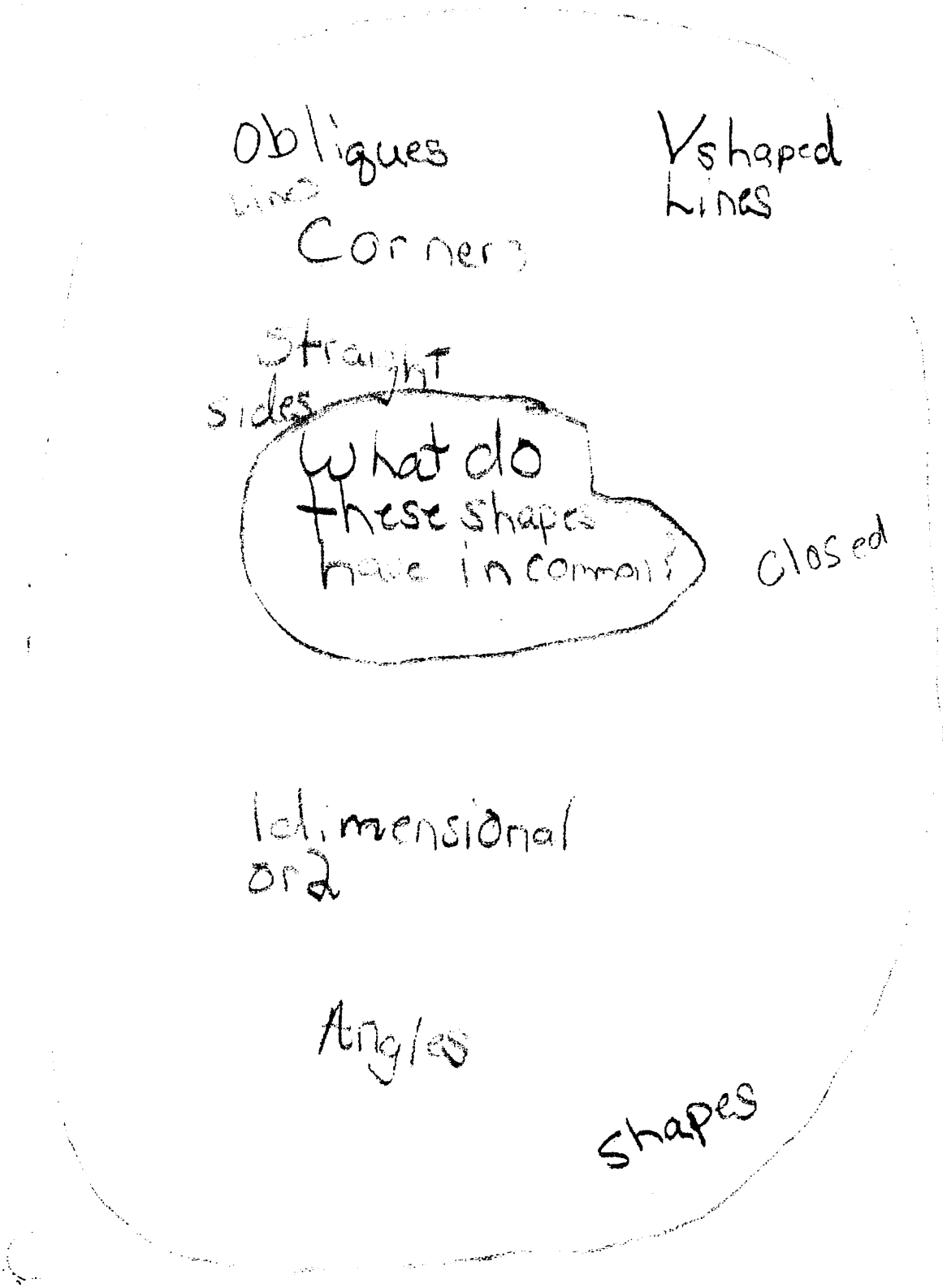
- If-then situations when solving problems
- Analyzing different ways of solving the same problem
- To write out "thinking" of how a problem was solved

Bridge Map

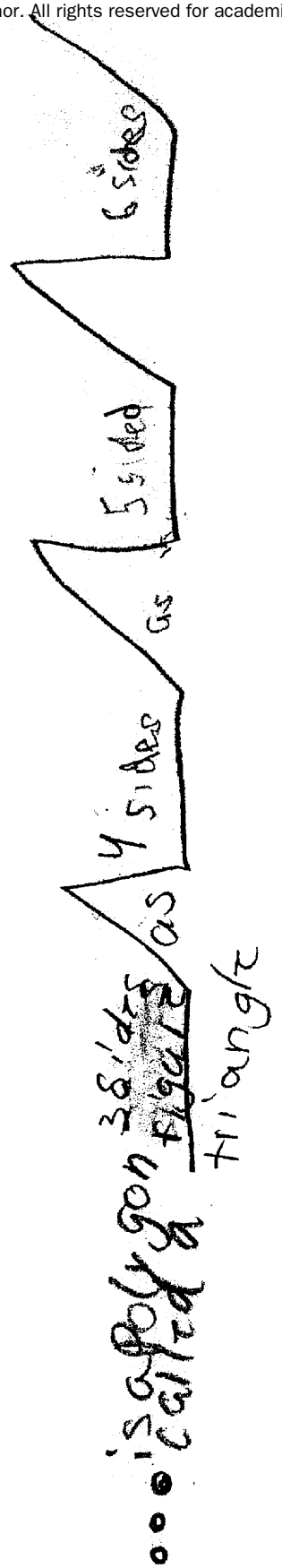
- Simplifying fractions
- Equivalent fractions
- Mixed/Improper fractions
- Identifying polygons
- Money
- Factors
- Multiples

Brace Map

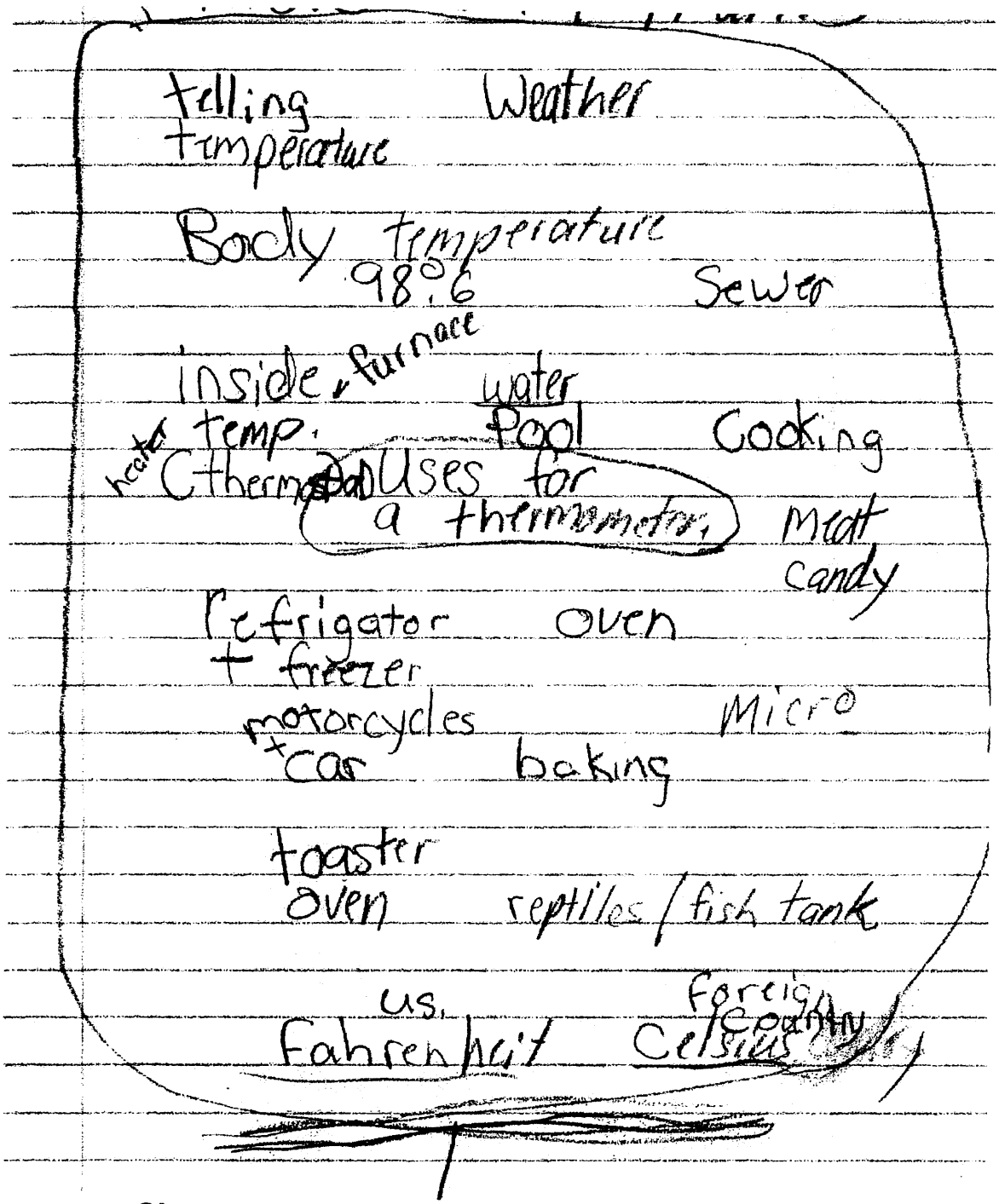
- Units of measurement
- Breakdown parts of a geometric figure
- Fractional relationships
- Money



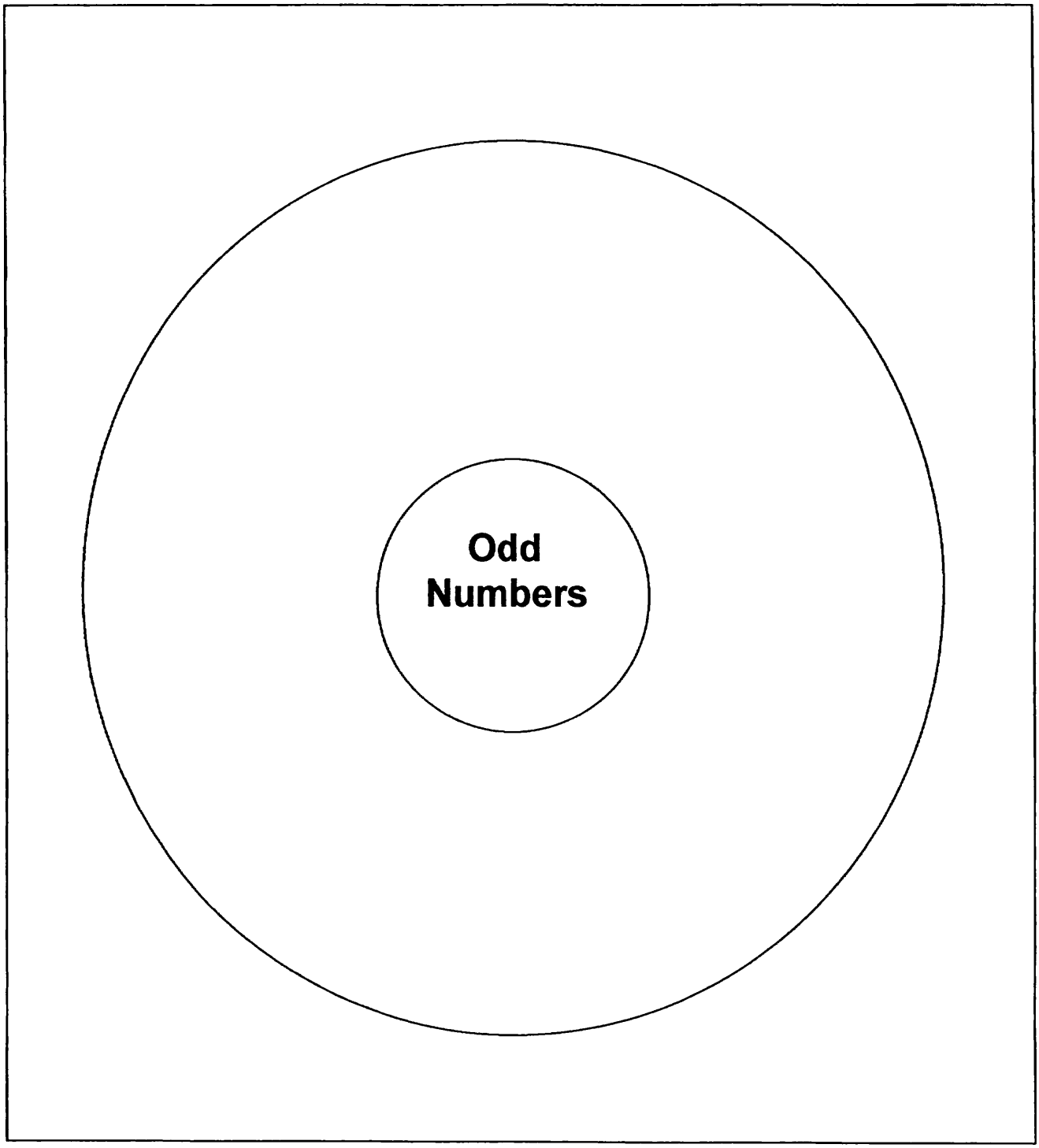
Introduction to Unit on Polygons



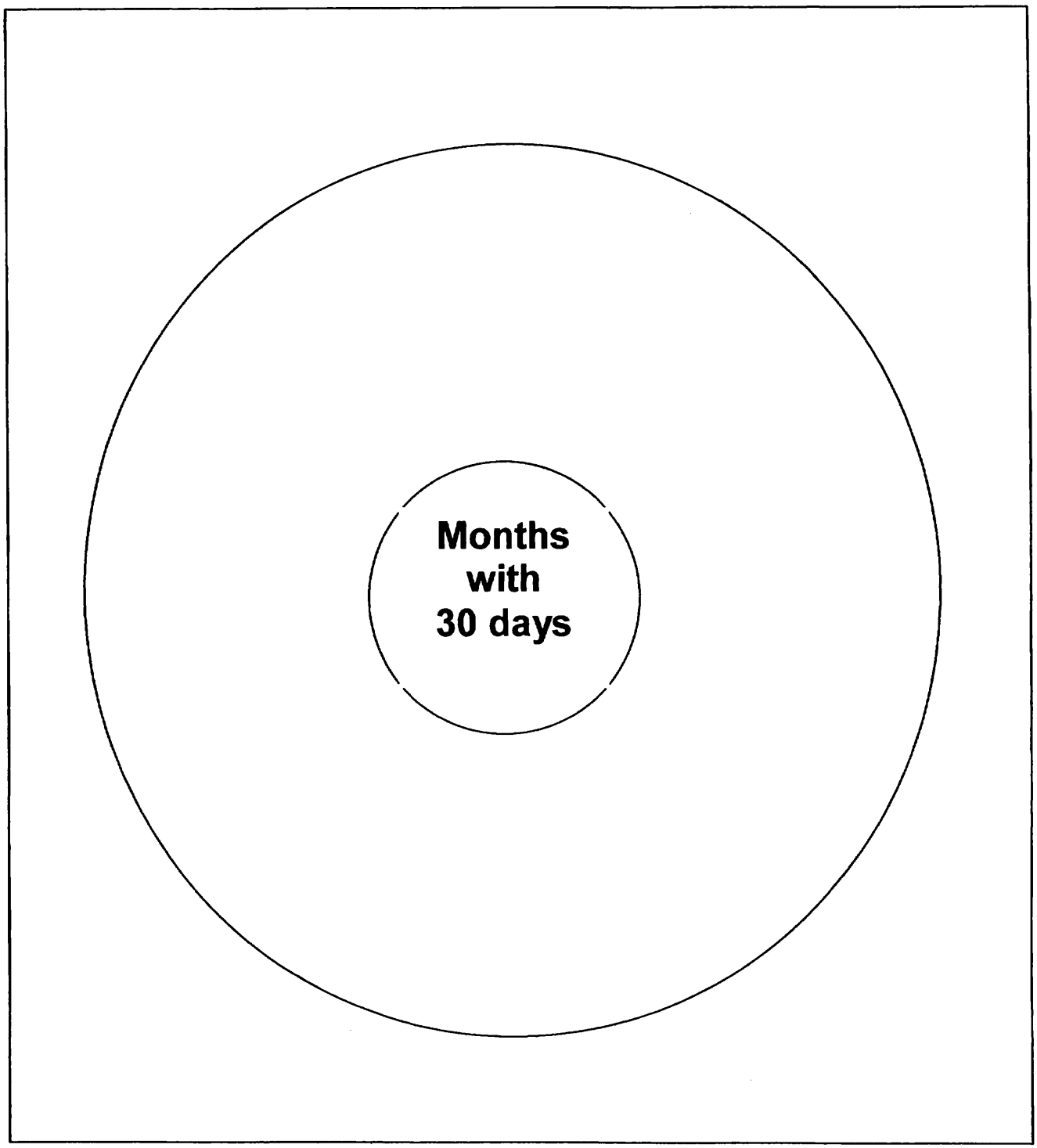
Assessment for identifying polygons



Classroom brainstorming about "Temperature"



As an assessment tool



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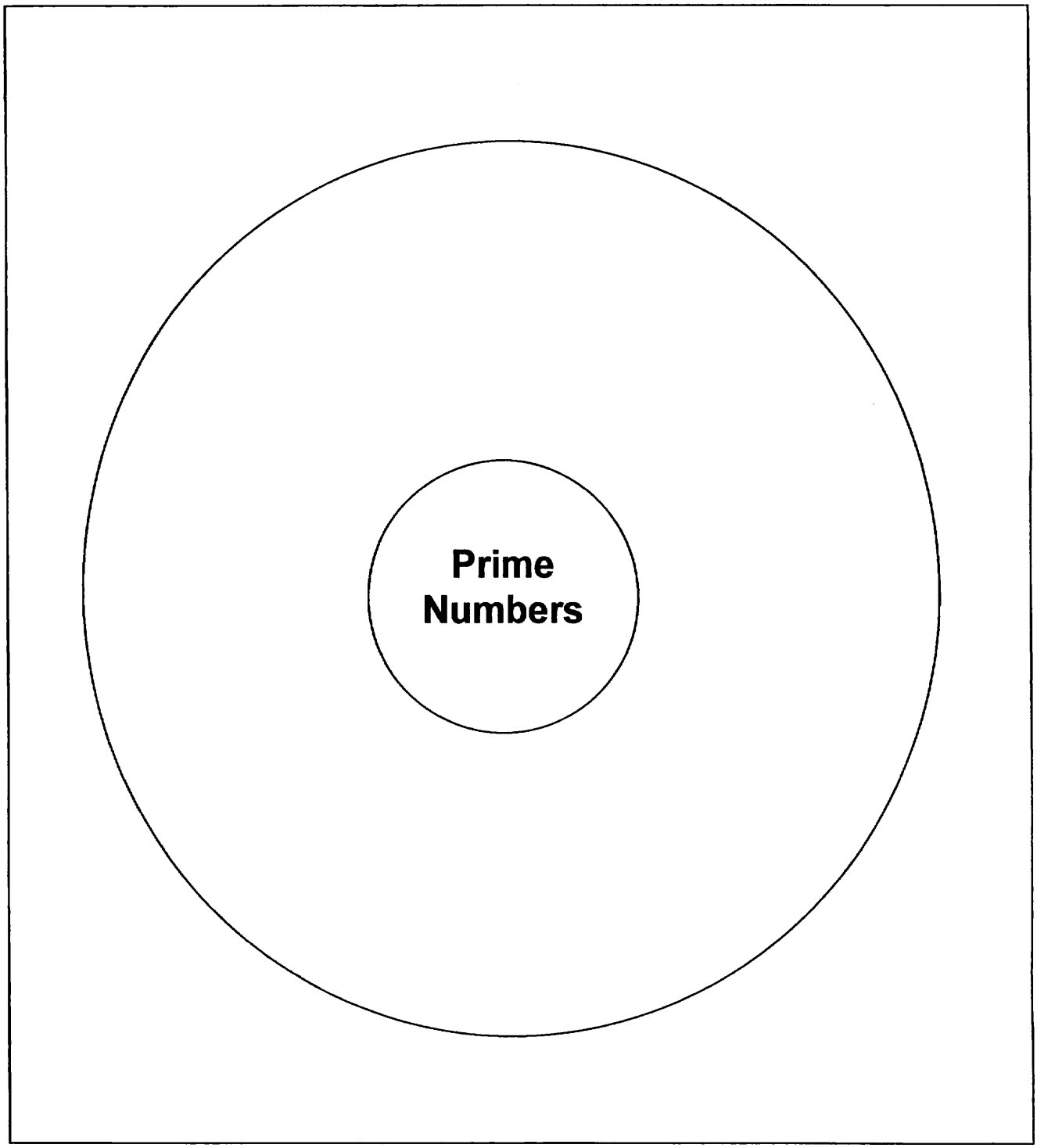

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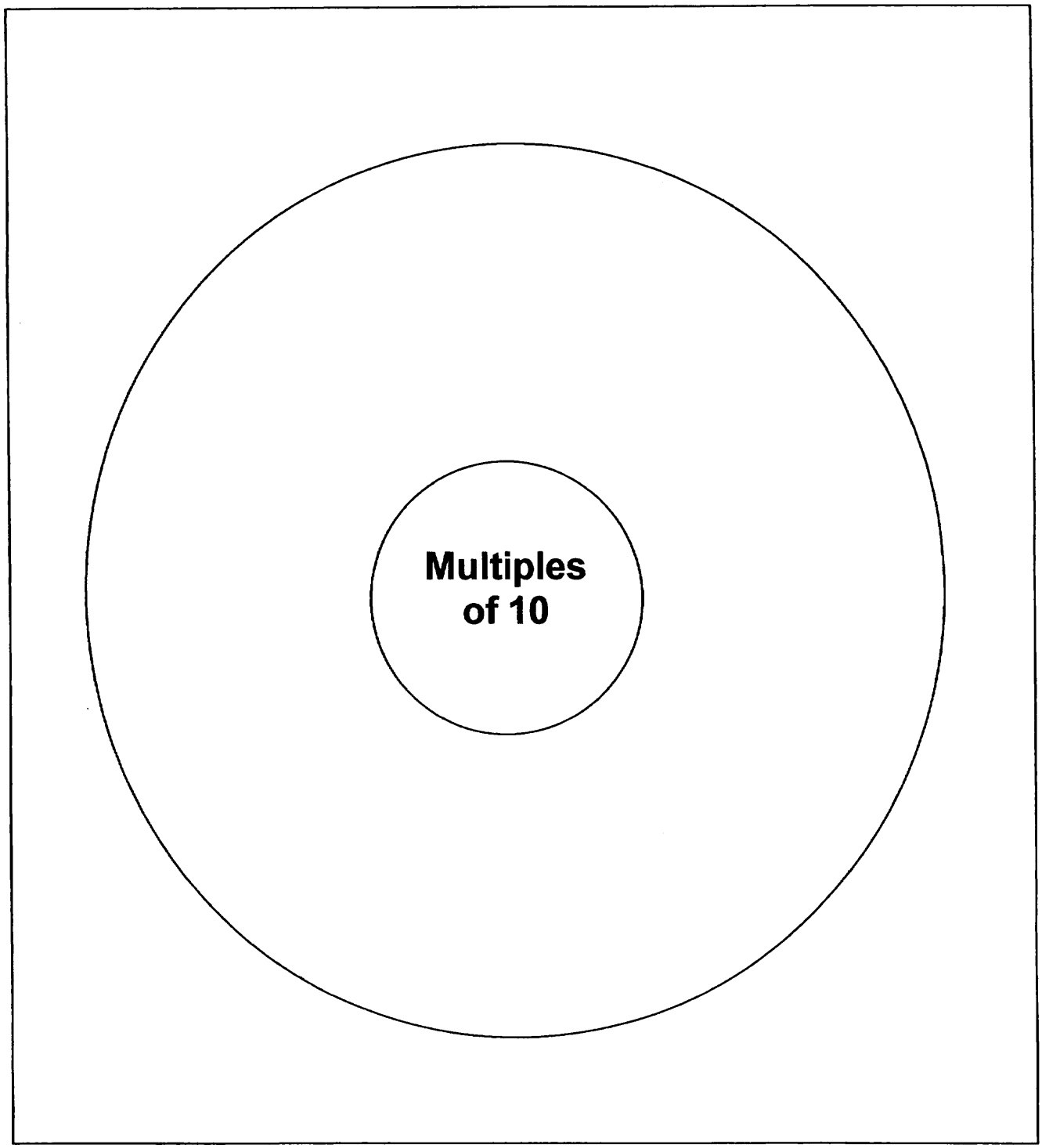


As an assessment tool

Science and Health Ideas Using Thinking Maps

Circle Map

- Prior knowledge and frame for "how" you know it.
- Note taking
- Pre-writing for reports
- Pre-reading
- Making inferences

Bubble Map

- Pre-writing to describing favorite animal
- Describing rocks by their attributes

Double Bubble Map

- Compare/Contrast different types of rocks
- Compare/Contrast systems of the body
- comparing results of an experiment

Tree Map

- Classifying types of rocks
- Rock hardness testing
- Note taking
- Sorting
- Taxonomy (plants and animals)

Flow Map

- Steps for an experiment
- Water cycle
- Life cycles
- Rock cycle
- Electrical flow
- Steps for "skill streaming"
- Seasons

Multi-Flow Map

- Causes and effects of pollution
- Predicting outcomes of an experiment
- Conflict analysis and resolution
- Show how a system of the body works (blood flow)
- Analyzing the causes and effects of pollution

Bridge Map

- Animals and their offspring
- Animal groups
- Organs of the body and their functions
- Vocabulary development

Brace Map

- Parts of a tooth
- Parts of the human body, animal or plant

Integrating Thinking Maps into the Science Curriculum

Rocks and Minerals – Grade 4

1. Use a Circle Map (individual to whole group) – "What do you know about rocks?" Use the frame to hold questions students have.

2. Pull out descriptive words about rocks from the **Circle Map** to place in a **Bubble Map**.

3. Show students Bill Nye's video on rocks. Students can use a **Tree Map** to take notes with branches for igneous, sedimentary, and metamorphic rocks.

4. After a class discussion about the types of rocks, students can create **Bubble Maps** for each type of rock. A written piece can follow.

5. Break the parts of the earth down using a **Brace Map** (crust, mantle, outer core, and inner core).

6. To show the progression of how volcanic rock forms, use a **Flow Map**.

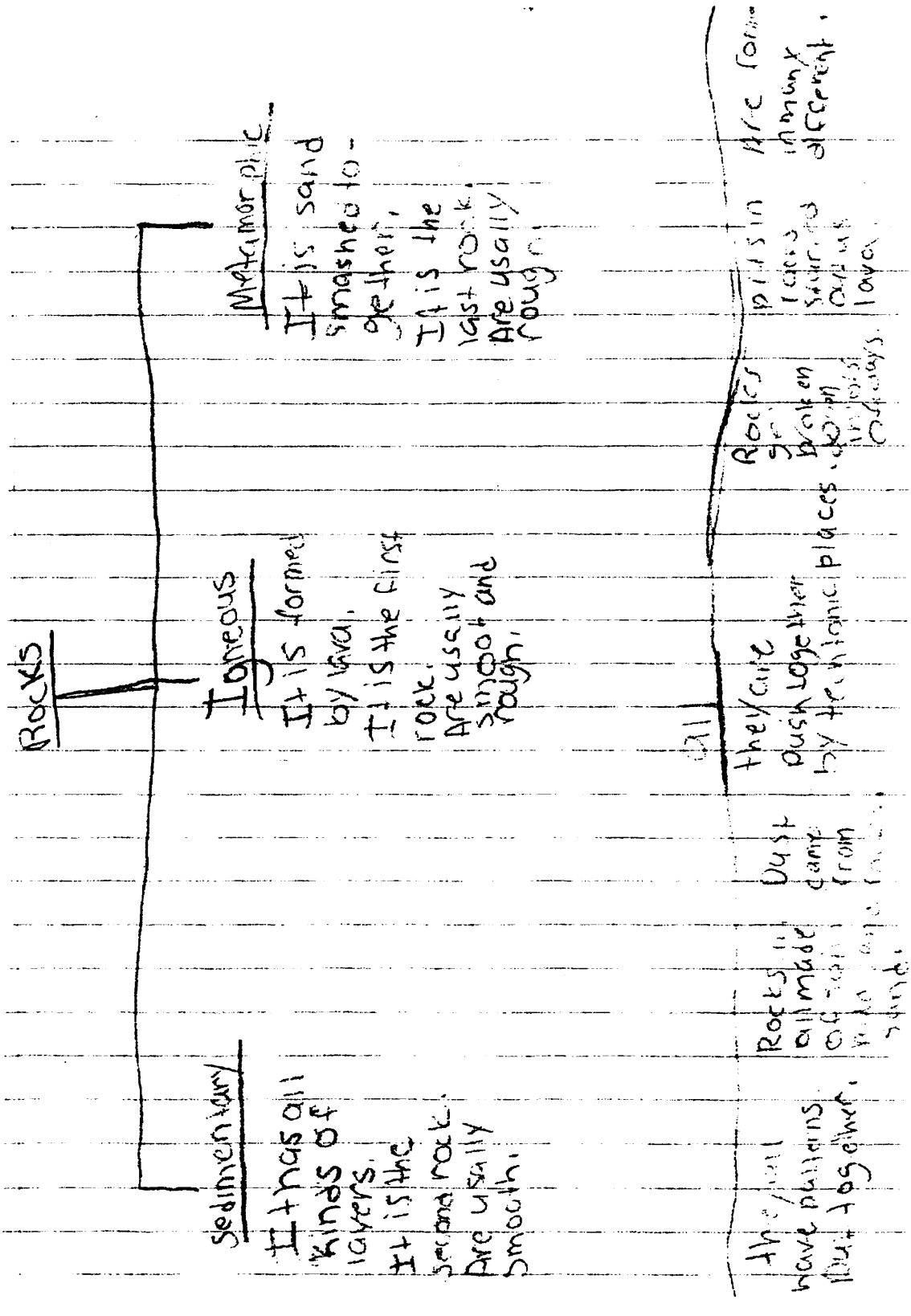
7. Use a **Multi-Flow Map** to highlight the causes and effects of a volcanic eruption.

8. Compare and contrast two different types of rocks by using a **Double Bubble Map**.

9. To identify examples of rocks, use a **Bridge Map** (obsidian is a type of igneous rock as sandstone is a type of sedimentary rock, etc.). This can be used as an assessment activity.

10. Draw a large **Circle Map** on chart paper. Have students cut pictures from magazines and catalogs that are made from rocks and glue them onto the map.

11. Using the hardness scale, test samples of rocks. Classify them using a **Tree Map**.



Note taking from a Bill Nye video on rocks using a Tree Map

Conclusion

Inspiration grows in many ways, and many interesting things have developed from the use of Thinking Maps. Recently, three of my students decided to try making a Triple Bubble Map using themselves as examples. It was a challenge, which they created for themselves, and I welcomed their enthusiasm. To see the joy of success on their faces solidified my feelings that using this "common language" is the best thing I've ever done as a teacher. I've seen students' writing and thinking skills improve in ways I could never imagine.

Upon completion of this project, I have now successfully used Thinking Maps for nine months. This was the first time my fourth grade students used any of these maps. Many of them have started to use them on their own for individual projects or activities of their choice. They like the way information is organized for them. Ask my students which map to use for what purpose and they will accurately tell you.

In addition, I have also completed the training of "trainers" given by Dr. Hyerle himself. I feel confident enough to help my colleagues with questions and ideas on how to integrate Thinking Maps into their lessons. Our whole staff is now trained. My hope is that the students coming to fourth grade next year will already have used Thinking Maps. With continued and consistent use, the impact on learning and thinking will know no bounds.

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