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UNIVERSITY OF CALIFORNIA, SAN DIEGO

Learning Tools to Enhance Student Achievement
in an ASL-English Flipped Classroom for Deaf Students

A thesis submitted in partial satisfaction of
the requirements for the degree of Master of Arts

in

Teaching and Learning: Bilingual Education (ASL-English)

by

Michelle Wing-Yee Chung

Committee in Charge:

Gabrielle Jones, Chair
Bobbie M. Allen
Tom Humphries

2016

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This thesis of Michelle Wing-Yee Chung is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

Chair

University of California, San Diego

2016

DEDICATION

This thesis is dedicated to every fellow friend, classmate, professor, cooperating teacher, colleague, and family member who supported me in any way that helped me endure on my endeavor to becoming an aspiring teacher for deaf children. I cannot thank every one of them enough for all their support through the last two years. Without them, I cannot imagine how I would have reached to where I am now.

I want to give thanks to all my cooperating teachers, Olivia Hannigan, Amy Seaman, Reyes Ribera, and Shauna Bolingbroke, for allowing me in their classrooms and for sharing their advices based on their teaching experience. Because of them, I was given the opportunity to gain authentic experience teaching in the classroom and to begin my growth as a new teacher.

Next, I want to sincerely give many thanks to my UCSD professors, Bobbie Allen, Gabrielle Jones, and Tom Humphries for sharing their knowledge and philosophies, honed from decades of life experience in the world of ASL-English Bilingual Education. All due to them, I was able to achieve my lifelong dream to become a teacher for deaf and hard-of-hearing students.

Most importantly, I want to truly thank my mother and father for everything they have done to support me with no limits. They have raised me to think positively, to believe in myself, and to never give up. They have taught me to follow my heart and do what I believe is the best for me. Thank you, Mom and Dad!

EPIGRAPH

Math is a science of not being wrong about things, its techniques and habits hammered out by centuries of hard work and argument. With the tools of mathematics in hand, you can understand the world in a deeper, sounder, and more meaningful way. All you need is a coach, or even just a book, to teach you the rules and some basic tactics.
I will be your coach. I will show you how.

Jordan Ellenberg

TABLE OF CONTENTS

Signature Page.....	iii
Dedication.....	iv
Epigraph.....	v
Table of Contents.....	vi
List of Figures.....	vii
List of Tables.....	viii
Abstract of the Thesis.....	ix
I. INTRODUCTION AND OVERVIEW.....	1
II. ASSESSMENT OF NEED.....	4
III. DISCUSSION OF MY APPROACH TO TEACHING.....	9
IV. REVIEW OF EXISTING MATERIALS AND CIRRCULA.....	15
V. KEY LEARNING THEORIES AND RELEVANT RESEARCH.....	17
VI. CURRICULUM DESCRIPTION.....	23
VII. EVALUATION PLAN.....	26
VIII. REPORT ON THE CURRICULUM IMPLEMENTATION.....	30
IX. RESULTS OF THE EVALUATION.....	76
X. CONCLUSION.....	79
XI. REFERENCES.....	81
Appendix A: Curriculum Materials.....	84
Appendix B: Lesson Materials.....	122
Appendix C: Students' Artifacts.....	154

LIST OF FIGURES

Figure 1: Screenshot of my pre-assessment Zaption video.....	42
Figure 2: The print copy of a question in the pre-assessment.....	42
Figure 3: Screenshot of my pre-assessment video with the sidebar.....	43
Figure 4: Minnie Mouse doing the sorting activity.....	53
Figure 5: The diagram on the whiteboard.....	54
Figure 6: My drawing of the hand-shaped mind map.....	60
Figure 7: Venom making his mind map.....	66
Figure 8: Cinderella drawing a mind map while watching my Zaption video..	70
Figure 9: Venom taking notes using the mind mapping method.....	71

LIST OF TABLES

Table 1.1: Block A and B schedules for 6 th Grade.....	32
Table 1.2: Block A and B schedule for 7 th Grade and 8 th Grade.....	32
Table 2: Number of students in my math and science classes.....	33
Table 3: Data collected from my quick, informal survey.....	38

ABSTRACT OF THE THESIS

Learning Tools to Enhance Student Achievement
in an ASL-English Flipped Classroom for Deaf Students

by

Michelle Wing-Yee Chung

Master of Arts in Teaching and Learning: Bilingual Education (ASL-English)

University of California, San Diego, 2016

Gabrielle Jones, Chair

With technology becoming more advanced and readily available in the classroom, an increasing number of teachers across the nation are seeking to flip their classrooms. That is, a flipped classroom moves lectures outside of the classroom via online videos, allowing more class time for student activities and

projects. To be successful in a flipped classroom, students will need to be able to learn through instructional videos, to take notes while watching the videos, and to think aloud when working on problems with classmates. Thus, this curriculum was created as an attempt to provide teachers structured lessons to teach deaf and hard-of-hearing students how to take notes, to watch instructional videos, and to think aloud. Those three learning tools prepare students in hope to enhance their student achievement in a flipped classroom. With this curriculum, students learn three popular note-taking strategies and utilize them in taking notes while watching instructional videos. After the implementation, the data, collected through assessments, teacher observations, and students' artifacts, showed that the students were able to take notes while watching instructional videos successfully. However, due to time constraints, they only learned one of the three note-taking strategies, and did not learn how to think aloud. Thus, the evaluation of this curriculum resulted in having three out of the four curriculum goals partially met. With more time allowed and more data collected, it was plausible that this curriculum as a whole would be effective.

I. INTRODUCTION AND OVERVIEW

While technology is evolving at a rapid pace in today's world, the classroom structure is also evolving, due to the public demands on teachers to integrate active learning in the classroom. With the Common Core Math Standards increasingly implemented in schools in California, more teachers are seeking ways to promote student engagement in their classrooms to meet the Standards. However, teachers often struggle to engage students effectively when there is so little time and so much to teach at school (Bergmann & Sams, 2012, p. 5). In the case of deaf and hard-of-hearing students, many students come from non-signing homes, which means having little or no access for help with homework at home. Hence, more teachers are exploring to adopt an innovative teaching movement called the flipped classroom model.

Basically, a flipped classroom takes lectures outside the classroom and brings what is traditionally done as homework inside the classroom (Bergmann & Sams, 2012, p. 13). That is, students watch lecture videos as their homework anywhere outside of the classroom, and come in class prepared to apply or do what they have learned. The most appealing benefit about the model is that watching lectures at home frees up more class time to do stuff that matters more for students' learning. Freeing up more class time allows active learning and authentic learning to happen, including hands on activities, project-based learning, peer teaching, cooperative learning, collaborative learning, and many more to mention. Drawn to its advantages, many teachers have flipped their classroom and many more are planning to flip their classrooms, as well.

Due to the rising popularity of the flipped classroom model, I felt a need to design a curriculum for teachers to assist deaf and hard-of-hearing students in the transition from a traditional classroom to a flipped classroom. Flipping a classroom could cause students to feel frustrated if they have never learned note-taking strategies or if they do not habitually take notes to retain new information. They may not be familiar with watching instructional videos to learn a concept. When working with a classmate during class, they may struggle to express their thinking process. Thus, I decided to create a curriculum that includes class activities for students to practice the skills that I believe are beneficial for success in a flipped classroom. The curriculum also aims to encourage students to improve and make use of academic language in both American Sign Language (ASL) and English.

There are four primary goals for this curriculum. The first of the four goals is *to provide students note-taking strategies to improve their note-taking skills*. There is no right away to take notes, but for this goal, students will learn a total of three popular, research-based, note-taking strategies in this curriculum. The three note-taking strategies are the mind mapping method, the outline method, and the Cornell method. By learning these strategies, students will be able to take notes for improved memory and recall of information.

The second goal is *to improve students' ability to watch instructional videos with active listening skills*. Because watching videos is a major part of the flipped classroom model, students will need to learn how to watch videos with good active listening skills in order to actually learn the materials on their own. This curriculum offers lessons for teachers to model to students how to properly watch instructional

videos. Thus, by meeting this goal, students will be able to take responsibility of their own learning and learn by watching instructional videos independently.

The third goal is *to increase students' metacognitive skills in math problem solving through the use of think-aloud strategy*. Thinking aloud is a strategy that helps students realize what is and what is not understood. It also allows classmates an access to each other's thinking process, so to learn how they arrive at their solution to a math problem. So for this goal, students will learn to utilize the think-aloud strategy as they work on a math problem with the teacher or with a peer.

Finally, the fourth goal is *to encourage students to utilize their math academic language in both ASL and English*. This goal should be integral in any bilingual classroom, and thus, be enforced during instruction at all times in the math classroom for deaf and hard-of-hearing students. This curriculum offers numerous opportunities for students to express in both ASL and English using mathematical language while conversing with each other or with the teacher in the math classroom.

In the next section, I assess the need for teaching students the skill of taking notes, active listening, and thinking aloud, in order for them to increase their chance for success in a flipped classroom.

II. ASSESSMENT OF NEED

Through my personal experiences as a student teacher and interactions with fellow educators, I observed and identified four major problems with regard to teaching math to deaf and hard-of-hearing students. The first problem is the amount of class time consumed by reviewing and lecturing, leaving little time left for active learning. It happened often during my student teaching experiences that students came back the next day without completing their homework because they did not understand how to do it independently. That caused a chunk of the class time being used up for reviewing or re-teaching, so that they could proceed to the next topic. In the end, the remaining class time was insufficient to complete a new lesson or an in-class activity. Several educators that I talked with also expressed the same problem – not having enough time to teach everything and for active learning to happen in the classroom.

Aaron Sams, one of the most influential pioneers in the flipped classroom movement, made one simple, yet valid, point, “The time when students really need me physically present is when they get stuck and need my individual help. They don’t need me there in the room with them to yak at them and give them content; they can receive content on their own.” (Bergmann & Sams, 2012, p. 4-5). Suddenly, I realize that this makes perfect sense, and even more, the benefit of flipping is two-fold for deaf and hard-of-hearing students. Students receive the teacher’s individual help in class, while at the same time, they receive access to information in American Sign Language, unlike at home where most families do not sign. Hence, flipping the math classroom addresses the problem of not having

enough time for student engagement, and this curriculum will prepare students to adapt their learning style to the flipped classroom model.

Next, the second problem is due to teaching students who are “in the middle,” boring the gifted students and losing the struggling students. Accommodating students with a wide range of abilities and needs is one of the biggest struggles for teachers in today’s schools. There are “students who excel, to average students, to students who struggle with our content, to students who cannot read” (Bergmann & Sams, 2012, p. 28). Every student learns at a different pace. Some may only need to listen once to understand a concept, while some may need the teacher to repeat at least once for them to process the information in their minds. Thus, flipping can address the need of instructional differentiation because it allows the teacher to personalize the learning for all students (Bergmann & Sams, 2012, p. 28).

Flipping the classroom means recording the direct instruction into online videos. Then, students can watch videos at their own preferred pace, and they can pause their teacher! Giving them the ability to pause their teacher allows them “the chance to process at the speed that is appropriate for them” (Bergmann & Sams, 2012, p. 24). They can pause, rewind, and re-watch a video until they gain a full understanding of a math concept, without having to feel embarrassed for asking the teacher to repeat. However, the teacher cannot expect that all deaf and hard-of-hearing students will know intuitively how to watch instructional videos. Some may not automatically realize the value of adjusting the speed of a video to satisfy their learning pace. Thus, this curriculum provides students teacher modeling and student activities that train them how to watch instructional videos.

Also, this curriculum encourages students to actually learn the contents of an instructional video by taking notes as they watch it. Note-taking has been found to significantly support both recall of lecture materials and synthesis and application of new knowledge (DeZure, Kaplan & Deerman, 2001, p. 2). What's more, deaf students can pause to write down notes without missing anything. Typically, deaf students often miss out what the teacher has said when they look down to write notes and when they look at the writing on the wall. Therefore, having the choice to pause the teacher potentially eliminates the struggle for deaf students when it comes to taking notes.

This leads to the third problem, which is the lack of students having a good habit of taking notes during class lectures. I asked my cooperating teachers and several teacher friends if they had seen students taking notes. Most expressed that they did not. A lot of students nowadays get worksheets or handouts from teachers. They also expressed that they did not always require their students to take out their notebooks and take notes. Alex Zernovoj, one of the former UCSD graduates in my program, commented in response to my inquiry, "In my past teaching experience, my students rarely take notes in class, especially during classroom discussions. They still need to work on taking good notes through more note-taking mini-lessons and hands-on practice." (Zernovoj, 2016).

Even in all my three student teaching placements, I did not see students open up a notebook, take a pencil, and take notes as they watch the teacher teaching, except a couple of students in 8th Grade. It astonished me that they did not take notes and yet complained that they could not remember what they had learned the day before. Therefore, I felt that it is imperative that students need

structured lessons in learning how to take notes.

Finally, the fourth problem is the lack of communication and support at home, especially for those students whose parents do not sign. According to National Institute on Deaf and Other Communicative Disorders, more than 90% of deaf children are born to hearing parents, and the majority of those hearing parents do not sign. In all my three student teaching placements, my cooperating teachers expressed their relentless frustration about the lack of support for their deaf students at home. Students often struggle to do their homework at home because they could not ask for help and their parents do not sign.

To address this fourth problem, the math classroom is flipped so that students get the language and support that they need most at school, instead of at home. When students get stuck on a problem or have questions during class, they get immediate help from the teacher or more competent peers. When they are at home, they watch the teacher's instructional videos in ASL and take notes. Then in class, students are given more opportunities to share and explain what and how they arrived to their solutions to a math problem, both in ASL and English. In other words, they need to practice the skill of thinking aloud (signing out what they are thinking). Hence, this curriculum promotes students to practice and utilize all three skills as mentioned earlier in this publication – taking notes, watching videos, and thinking aloud.

On an additional note, flipping encourages parents to get involved in their children's learning and even educates them (Bergmann & Sams, 2012, p. 30)! Parents, whether deaf or hearing, can watch videos and learn together with their child at home. Hearing parents (and deaf parents who do not sign) may pick up

some ASL signs to communicate with their deaf child. This could positively improve or strengthen parent-child relationships.

Before going further about my curriculum, it is important that I discuss my approach to educating deaf and hard-of-hearing students in the next section.

III. DISCUSSION OF MY APPROACH TO TEACHING

With the fact that more than 90% of deaf children are born to hearing parents, according to National Institute on Deaf and Other Communicative Disorders, much less than 10% of deaf children are readily exposed to ASL as early after birth. Relatively very few hearing parents learn ASL to support an early language acquisition for their deaf children. The rest of the 90% of deaf children in the States do not have access to ASL until they attend school where they start acquiring Basic Interpersonal Communication Skills (BICS; Cummins, 1999) in ASL and English. That is, students acquire and use everyday language to interact socially with other people at school. In the math classroom, students are required to engage in conversation about math (also known as “math talk”). Talking math (or thinking aloud) requires the use of Cognitive Academic Language Proficiency (CALP; Cummins, 1999) in ASL and English, which could be challenging for students who do not come from signing homes. In order for them to learn to use CALP, the best setting would be in a bilingual classroom with the teacher being their ultimate role model as a proficient user of BICS and CALP in both ASL and English.

As an aspiring Deaf teacher and a native user of two languages - American Sign Language (ASL) and English, it becomes evident that my approach to teaching must align with the bilingual education pedagogy. I will always be in the “bilingual speech mode” (Grosjean, 1992, p. 59), that is, code-switching both languages through the entirety of my teaching in the classroom. Because deaf students require ASL for communication and English for reading/writing, both instructions in ASL and English have equal emphasis in the classroom. One

cannot simply deprive either one of ASL or English from a Deaf classroom, which is essentially impossible. Therefore, bilingual development and bilingual teaching are central to my approach to teaching deaf students.

In the light of the bilingual approach as my approach to teaching, I aim to follow Garcia (2009)'s guidelines on the principles and practices of the bilingual education pedagogy. According to Garcia (2009), there are two basic principles of bilingual pedagogy – the Social Justice principle and the Social Practice principle (p. 318). The Social Justice principle emphasizes equity in the classroom, the understanding of struggles surrounding the use of two languages, the high, but fair, expectations and rigors, and relentless assessment on students' learning. The Social Practice principle encourages interaction and involvement among the teacher and students, language development, collaboration and group work, and relevance to students' personal experiences, cultures, language practices, and identities. In order to accomplish bilingual/multicultural education pedagogy, it is important to pay attention to both social justice and social practice. Ignoring either one of the two basic principles will result in an ineffective bilingual pedagogy.

At the same time, I aim to align my teaching with the recent research from the Visual Language and Visual Learning Science of Learning Center, a collaborative research hub with various scholars across different universities, based at Gallaudet University. The principles, for which VL2 stands for, is the notion that deaf children are visual learners, and therefore, it is evidently natural for them to acquire a visual spatial language like ASL at a very early age. Garate (2012) provided research-based on the benefits of learning in an ASL-English bilingual classroom for deaf and hard-of-hearing children. By providing full access

to a strong language foundation in ASL, deaf children will in turn develop English language.

This is further supported by Cummins's theory of Common Underlying Proficiency (CUP), or also known as the "twofold threshold hypothesis" (Hamers, 1998, p. 59). Cummins hypothesized that the natural language competence threshold has to be reached first in order to succeed in exceeding the second language competence threshold (Hamers, 1998, p. 59). In other words, the development of a strong first language (ASL in a deaf child's case) supports the development of a second language (English). The higher the level of competence in a first language (L1) is, the higher the level of competence in a second language (L2) will be (Hamers, 1998, p. 60). Thus, the developments of both languages are interdependent, which further supports the palpable need of a bilingual approach in my classroom.

I am also a strong believer of Cummins's theory of empowering minority students. Since Deaf children are minority students, his theory supports the need of the bilingual approach to teaching. Cummins defines four fundamental elements that empower minority students. These elements include cultural/linguistic incorporation, community participation, pedagogy that requires reciprocity and interactions between students that encourages active learning rather than passive learning, and assessment that seeks to empower students to take control of their own learning (Cummins, 1986). To empower students, I will highly "encourage them to assume greater control over setting their own learning goals and to collaborate actively with one another in achieving these goals" (Cummins, 1986, p.

667). Empowered students are more likely to enjoy learning when they are given the choice to decide how and what they want to learn.

In order to create a bilingual and multicultural classroom where students are empowered to work together and accomplish their own learning goals, I believe that cooperative learning is one such type of teaching methodology that greatly supports my bilingual approach. Kagan (2008), the renowned researcher and authors of books on cooperative learning in the classroom, encourages teachers to provide students a healthy balance of cooperative, competitive, and individualistic learning experiences in order to prepare students the flexibility to adapt in various social situations. Students in a cooperative learning environment are more likely to experience academic and social benefits, which include higher empathy, higher self-esteem, stronger social skills, more social relationships, higher academic achievement, and better attitude towards learning and working with others (Kagan, 2008).

Additionally, cooperative learning (and collaborative learning) endorses the Social-Cognitive Interaction model (Hamers, 1998), which in turn, backs the necessity of the bilingual approach in a Deaf classroom. According to this model, in order for a deaf child to gain the most advantage from a bilingual experience, both ASL and English “have to be used and valorized by relevant others in the child’s social network” (Hamers, 1998, p. 64). Hamers’ social-cognitive interaction model correlates with Vygotsky’s sociocultural theory that learning is a social process. Social interaction in the classroom plays a fundamental role in deaf children’s cognitive development. Humphries (2013) pointed out “many deaf children come to school from homes where they may not have had enough access

to language and social mediation of meaning-making” (p. 19). Therefore, deaf children need a much more social interaction within the classroom in order to thrive emotionally and socially, which means the majority of the class time should be devoted to activities that promote student interaction and communication in both ASL and English.

Furthermore, equity is another important element of a bilingual and multicultural classroom. Deaf students will come into my classroom, each with different language and cultural background. As a teacher, I want to learn to recognize those differences. Lisa Delpit (1995) places an importance on recognizing cultural differences in the classroom and embracing each difference as something unique in a positive light. Not only does equity refer to cultural differences, equity should be defined “the fair distribution of opportunities to learn” (Esmonde, 2009, p. 1010). In other words, I aim to differentiate instruction in ways that every one individual has equal opportunities to learn and be given different ways to show their understanding. For example, some students may prefer explaining a math concept in ASL, while others prefer to do it in English. Some may prefer learning math content by watching videos in ASL, while others prefer reading textbooks in English.

Therefore, the goal of my approach to teaching is to make my classroom as bilingual, multicultural, social, and differentiated as possible. I am not only a teacher, but also a facilitator. My students will be empowered to take control of their learning within my classroom, and both my students and I will share the responsibility of teaching and learning in both ASL and English. As a Deaf bilingual teacher, I strive to provide students “the opportunity to become bilingual”

(Grosjean, 1992, p. 58) in both ASL and English.

Next, I present how I searched for any existing materials and/or curricula that are relevant to my thesis project.

IV. REVIEW OF EXISTING MATERIALS AND CURRICULA

In search for other work similar to my project, there are countless research articles on the advantages and disadvantages of the flipped classroom model. Actually, the idea of a flipped classroom is not new and has been around for a couple of decades. It was not until recently in 2007 when two chemistry teachers, Jonathan Bergmann and Aaron Sams from Woodland Park High School in Colorado, explored and practiced the use of the flipped classroom model, which then drew a popular attention in the social media.

Bergmann and Sams called themselves “pioneers in the movement” (Noonoo, 2012). They clarified that they did not invent the flipped classroom model, and mentioned in their interview with Noonoo (2012) that a couple of professors from the University of Miami wrote about the concept of “the inverted classroom.” They just popularized the model starting in 2007, and ever since then, the flipped classroom model has been gaining interest from an increasing number of teachers across Canada and the United States of America.

However, I could not find one work that involved deaf students in a flipped classroom. I tried typing different combinations of the main keywords in the Google search engine, including, but not limited to, math, flipped classroom, flipped learning, deaf, ASL, bilingual, and so on. Search results came up with math flipped classrooms, bilingual flipped classroom (e.g. English and Spanish), deaf students in a math classroom, and math instruction for deaf students, but there was not one work that explored the aspect of teaching deaf and hard-of-hearing students how to navigate one’s learning within a flipped classroom.

When I searched online for existing materials for teaching students to take

notes, I did find ample materials online discussing the positive effects of note taking on student learning. Still, I could not find or failed to find any existing curricula that is designed to teach deaf children to take notes using instructional videos conducted in ASL. I want to try to design a curriculum that teaches deaf students how to watch ASL instructional videos and be able to take notes as they watch them. I also want to incorporate lessons on teaching students how to think aloud during class activities in a flipped classroom. Since I could not find a curriculum that teaches deaf students to take notes, to watch instructional videos, and to think aloud, I decided to get on with creating one for my thesis project.

In the next section, I discuss the key learning theories that I identified are integral for the foundation of my curriculum.

V. KEY LEARNING THEORIES AND RELEVANT RESEARCH

In a flipped classroom, lectures are taken out of the classroom and recorded in videos, causing more class time to become available for active learning. Active learning is not a theory, but a process of student learning. By definition, active learning is “anything that involves students in doing things and thinking about the things they are doing” (Bonwell & Eison, 1991, p. 2). Since this curriculum is designed to incorporate active learning in a flipped classroom, I looked for learning theories that support active learning as well as being compatible with the flipped classroom model.

As a result, I found that there are many learning theories that I could incorporate into my project, and many of them overlap in terms of similar philosophies or some may be interchangeable. For this curriculum project, I decided to focus on three key learning theories that will form the basis for all the learning activities in this curriculum. These three key learning theories are project-based learning, cooperative learning, and Vygotsky’s theory of zone of proximal development (ZPD).

Firstly, project-based learning (PBL) is a kind of teaching approach where direct instruction is replaced with more student-centered learning activities. Note that PBL can also be called problem-based learning, but since there is not much conceptual difference between the terms “project” and “problem,” I use the term “project” in this publication. Traditionally, most teachers assign students problems to do after giving lectures, but in PBL, students are given real-world problems at the beginning and learn as they work in small groups. They apply their prior knowledge and construct new knowledge as they investigate in search for

solutions or answers. In short, PBL “integrates knowing and doing” (Markham, 2011).

Moreover, PBL allows students to perform and practice the higher-order thinking skills on Bloom’s Taxonomy. Blumenfeld, et al. (1991) elaborated that in PBL, “students pursue solutions to nontrivial problems by asking and refining questions, debating ideas, making predictions, designing plans and/or experiments, collecting and analyzing data, drawing conclusions, communicating their ideas and findings to others, asking new questions, and creating artifacts.” Artifacts can be in various forms of media, such as photography, videos, technology, writing, drawing, and many more. Students develop their active listening and speaking/signing skills by working with other students cooperatively and collaboratively. Thus, PBL promotes students to take responsibility of their own learning progress and to take ownership of their success.

In addition, the role of students is to ask questions, construct knowledge, and find a real-world solution to the problem presented in class. The role of the teacher is more of a facilitator more than a classroom expert. The teacher does not take full control over how the learning occurs in the classroom. Instead, the teacher facilitates the learning activities in the classroom, asks questions that prompt students to think critically, and provides guidance or assistance as students work on a problem. Since PBL relies on learning groups, which requires class time, flipping the math classroom provides this kind of learning to happen.

But what if some students slack off, making other teammates do more work when they are supposed to work collaboratively? This is where the next key learning theory, cooperative learning, comes in. Cooperative learning is where

students work and learn in small groups to achieve a common goal. The approach to cooperative learning arranges the classroom structure in a way that students learn through socialization. They gain both academic and social benefits, which includes, but not limited to, higher self-esteem, higher empathy, higher academic achievement, and stronger social skills (Kagan, 2008). In addition, Prince (2004) did a meta-analysis of literature on active learning, and summarized from research that cooperative learning “enhances academic achievement, student attitudes, and student retention” (p. 5).

Furthermore, Johnson and Johnson (1999) identifies five features of a successful cooperative learning activity, and these five features are as follows:

1. *Positive interdependence* (realizing that success comes with working together interdependently)
2. *Face-to-face interaction* (supporting and assisting one another’s success through face-to-face interaction)
3. *Social skills* (developing social skills by working together effectively)
4. *Individual and group accountability* (taking responsibility of one’s own learning and work while achieving group goals)
5. *Group reflection* (reflecting on the effectiveness of working together as a group)

All these five features are essential for students to achieve a positive learning experience in a flipped classroom, whereas the approach used is project-based

learning or cooperative learning. Both types of approaches overlap in terms of the belief that learning happens through interaction and communication with other human beings. I will come back to discuss more on this when I introduce Vygotsky's theory of zone of proximal development next.

I read about a study by Gillies and Ashman (2000), who investigated on how the use of cooperative learning can be beneficial to students with learning disabilities. In this study, they discovered that children with learning difficulties have better academic achievement when working in small, structured cooperative groups. In structured cooperative learning environment, students are more involved, see different perspectives, and get immediate feedback and support from the teacher and peers. Although it is not implied that all Deaf students have learning difficulties, this study still shows evidence that cooperative learning generally has positive effects on students, including those who are gifted and those who have learning disabilities.

Stevens and Slavin (1995) also received similar results about the effectiveness of cooperative learning in promoting higher student achievement and higher social skills after a 2-year study of the cooperative elementary school model. They studied five elementary schools, two adopting the cooperative elementary school model while the other three did not. They compared the academic and social outcomes of the students at those schools, and found that students in the cooperative schools outperformed their peers in the more traditional schools in terms of academic achievement and social relations.

While I was reading about cooperative learning strategies, I came across this very interesting strategy that I aim to implement often in my flipped math

classroom. This strategy is called “Thinking Aloud Pair Problem Solving” or TAPPS. Jack Lochhead and Arthur Whimbey (1987) introduced TAPPS in their paper, “Teaching Analytical Reasoning Through Thinking Aloud Pair Problem Solving.” Basically the idea behind TAPPS is that a pair of students works together on a set of problems, thinking aloud and listening to each other. One would think aloud while solving a problem, while the other listens, asks questions for clarification, and catches any errors. Then they switch roles. I believe that by doing TAPPS, students would significantly develop their thinking aloud and listening skills.

Next, the third key learning theory is Vygotsky’s theory of zone of proximal development. Vygotsky (1978) defines a zone of proximal development (ZPD) as the area “between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers” (p. 86). That is, a student cannot exceed his/her maximum learning potential on his/her own unless someone more competent offers guidance. Thus, in order for students to build knowledge and master various skills, including communication and problem-solving skills, they need increased interaction with the teacher and with peers, which supports the need of an implementation of the flipped classroom model in a math classroom.

The theory of ZPD fits well with problem-based learning and cooperative learning since both approaches place learning within the support of peers in small groups (and the teacher). In a flipped classroom, students work together in search for understanding, knowledge, and solutions to problems presented in class. They

have the teacher and more competent peers readily available to get help or guidance from when they get stuck on a problem and be able to move further away from the center of their ZPD once they gain understanding.

Moreover, as a teacher, I could work closely with those struggling students in a one-on-one or small-group setting, and support them by scaffolding.

Scaffolding is “a teaching strategy wherein the teacher creates a ZPD by controlling various elements of the task so as to ensure successful completion through the use of hints, reminders, encouragement, and modeling” (Thousand, Villa, & Nevin, 2015, p. 113). I also could pair or group more competent students with less competent students so that their ZPD overlaps. I believe that students strive more through participation and communication with others (in both ASL and English) as long as their learning experiences stay within their ZPD. Thus, this can be achieved by flipping the classroom to devote more class time to socialization and group works.

With the implementation of the three key learning theories, my curriculum is designed to be student-driven. Imagine my curriculum as clay and the students are the mold. They shape my curriculum, not me as the teacher. I provide the clay (such as information, knowledge, materials, and so on) while the students decide how they want to mold it, but molding the clay is not an easy task. To mold the clay, they need to combine their heads together in search for a solution together, and the reward will be a collaborative product of students’ achievement.

In the next section, I present the description of my curriculum.

VI. CURRICULUM DESCRIPTION

My curriculum, “Learning Tools to Enhance Student Achievement in an ASL-English Flipped Classroom for Deaf Students,” is designed to provide Deaf students the skills that I believe, with evidence-based research, would help improve student achievement in a flipped classroom. To recall what a flipped classroom is, it shifts the structure of a classroom in a way that students watch lecture videos at home and do their “homework” in the classroom. Moving from traditional to flipped may cause a dilemma for students when they are not familiarized with watching instructional videos and taking notes to learn new knowledge independently at home. Therefore, my curriculum consists of structured lessons that help develop or improve students’ skills in note-taking, active listening, and thinking aloud.

In this curriculum, there are a total of three units, each addressing a different learning focus that students need to efficiently learn mathematics in a flipped classroom. Each unit consists of two lessons, and within one of the lessons, there are one to three mini lessons. Each lesson is tailored to meet one or two of the four curriculum goals, which are as follows:

1. To provide students note-taking strategies to improve their note-taking skills
2. To improve students’ ability to watch instructional videos with active listening skills
3. To increase students’ metacognitive skills in math problem solving through the use of think-aloud strategy

4. To encourage students to utilize their math academic language in both ASL and English

Every lesson plan in my curriculum follows this same format. At the beginning of every lesson, one or two curriculum goals are indicated, and then following the curriculum goal(s) is a list of target standards. For this curriculum, I used standards taken from California's Common Core State Standards (CCSS) for Mathematics and for English Language Arts and Literacy in History/Social Sciences, Science, and Technical Subjects. Then, there are two objectives, one for learning and one for language. Those objectives are what students are expected to achieve after the end of a lesson. After the objectives are the formative and summative assessment tasks. Formative assessment tasks are tasks that students are observed to perform such tasks so that the teacher can assess their level of understanding of what is learned in a lesson. Summative assessment tasks are tasks that students are expected to be able to perform at the end of a lesson so that the teacher can assess whether or not the objective is met.

Next, the second half of each lesson is divided into three major sections: "Before Class," "During Class," and "After Class." The "Before Class" section shows what materials are needed and preparation to do before the lesson can be implemented. The "During Class" section comprises of a step-by-step implementation of the lesson, which is organized in three parts: Launch, Explore, and Summarize. The Launch part is where students are introduced to the information that they need to perform the lesson. The Explore part is where students work independently or in small groups to solve a problem or perform a task. The Summarize part is where students get back together, share their solution

or finished work, conclude on the big ideas, and do a reflection. Finally, the “After Class” section gives a description of what the teacher needs to do after a lesson is finished.

This curriculum consists of three units, each having a different learning focus. In Unit 1, students learn three popular note-taking strategies. They are the mind mapping method, the outline method, and the Cornell method. Students learn how to use these strategies and practice taking notes in class using each of the strategies. In Unit 2, students learn how to watch instructional videos. That is, they practice their active listening skills by taking notes using the note-taking strategies while watching videos. Finally in Unit 3, students develop and improve their thinking-aloud skills by examining different types of think-alouds. They learn how to express their thinking process in both ASL and English using thinking stems, such as “I notice...” and “I am figuring out...” They also learn how to use the Thinking Aloud Pair Problem Solving method (TAPPS) and practice using it when working on math problems with a partner.

Next, I explain the evaluation plan that I employed during the implementation of my curriculum.

VII. EVALUATION PLAN

To measure the effectiveness of this curriculum, I conducted my evaluation plan that collected data from four different sources. The four sources were student/teacher reflections and three types of assessment – the pre-/post-assessment, the formative assessment, and the summative assessment. First, the pre-assessment was done prior to the implementation of the curriculum to discover how much a student might already know about the components of the curriculum. The post-assessment was conducted after the implementation to compare the results for possible signs of improvement. Second, the formative assessment was done during the learning process to determine how a student was making progress toward a learning goal. Finally, the summative assessment was done at the end of a unit to assess a student's mastery and understanding of a topic after instruction. By collecting data from these four sources, I was able to evaluate whether or not my curriculum goals were met.

Before the beginning of this curriculum, two forms of pre-assessment were conducted, one as an interview and one as a test. Before implementing the curriculum, I wanted to get to know my students and how they felt about math, taking notes, and watching videos. I conducted an individual interview with each student and wrote down the responses. Then right before the first lesson, I handed them a set of five problems that checked the students' prior knowledge on the math terms in English and the order of operations. This helped me assess students' strengths and weaknesses in this math topic, and enabled me to make necessary adjustments to my lessons. After three units were taught in this curriculum, a post-assessment (the exact same set of five problems) was given to

the students to perform. This way, the students and I could compare the before and after results that reflected on what they had achieved from the curriculum implementation

The first lesson of each unit was also designed as a form of a pre-assessment. In the first lesson of each unit, students participated in student discussion in ASL about what they know about the topic being discussed by brainstorming in ASL and writing down in English. As they brainstormed, I observed their conversations to better identify their level of understanding at that point. For example, I gave them a task to sort given examples (i.e. examples of notes) and asked them to explain in both ASL and English their reasons for sorting them in the way they did. Asking students to sort given materials allowed me to grasp different perspectives that my students might have about a concept.

During the course of the following lessons within each unit, I used numerous forms of formative assessment. A formative assessment was an important tool for me, as the teacher, to keep in check for students' understanding. With formative assessment, students would be able to check whether or not they had understood how to do a task, or otherwise they would have to go back and figure out where they went wrong. While it provided feedback to students, it also gave me instant feedback on how I was teaching up to that moment. If most students were not getting the right answer, then I knew something was not clear on my part. Formative assessments guided me to make necessary adjustments and plan my next steps in instruction so that I knew what I needed to do to ensure my students' success.

Such forms of formative assessment that I used throughout this curriculum were Think-Pair-Share (students share ideas in class), Quickwrite (students write their response in a minute or two), warm-up problems (students perform math problems at the beginning to review), and asking quick questions during class time. While students were engaged in a conversation in ASL, I observed their conversations and attempted to gauge student understanding or to clear any misconceptions that might arise. I also wrote observational notes on post-it pads, in my notebook, or typed in on my laptop as soon as I was able to record them. In addition, I read their written notes to check for student understanding of a topic and for any common mistakes to clarify.

I was going to have the students self-evaluate using the student-generated rubric that they would create together in Unit 1, Lesson 1.3, but due to time constraints, I was not able to implement this lesson. If we did have the student-generated rubric, I would encourage the students to take responsibility of their own learning by using the rubric that they created to evaluate their own notes.

Since I did not see the need to test students on their abilities to take notes, to watch videos, and to think aloud, the summative assessment for this curriculum was all in the form of student performance. Toward the end of each unit, students had to show that they were able to take notes using the note-taking strategies that they learned in Unit 1. I observed how the students adapted to using the note-taking strategies to take notes while watching instructional videos in Unit 2, and recorded my observations. Note that in this implementation, I could only observe them using the mind mapping method, since the mini lessons for the other two strategies were deferred, due to time constraints.

Finally, personal reflections were regularly generated and collected by my cooperating teachers and myself. I was planning to have the students write reflections in responses to my reflective questions at the end of each lesson in this curriculum. The purpose of these student reflections was to increase students' metacognition on their own learning, and for me to observe whether or not they met the curriculum goals. Unfortunately, this did not happen due to the class time running out. I had also wondered how they would react if I had asked them to write a reflection, given that all students expressed to me their dislike for writing during our pre-assessment interviews.

Moreover, after every implementation of a lesson in my curriculum, I reflected and wrote down as many details and descriptions as possible in my notebook, on my phone and on my laptop. I also collected reflections and feedback from my cooperating teacher and my program supervisor (who visited me once during the implementation). The reflections from my cooperating teachers and myself were then taken into account in making adjustments to my instruction where necessary. After all, the collection of personal reflections gave me some great insights into how I performed during my curriculum implementation.

In the next section, I provide the detailed report of my curriculum implementation.

VIII. REPORT ON THE CURRICULUM IMPLEMENTATION

The School Site: The site of my curriculum implementation was at a residential school in California. It is a public, residential school that uses the ASL/English approach to educating deaf and hard-of-hearing students from Early Childhood to High School. The school was originally founded and located in San Francisco in 1860, and then Berkeley in 1869 before it got relocated to Fremont in 1980. Fremont has a population of 226, 551 (City of Fremont Official Website, 2016), making it the fourth most populous city in the San Francisco Bay Area.

The School: The residential school has a strong commitment to being a bilingual and multicultural community that is Deaf-centered and language-rich (in ASL and English) for deaf and hard-of-hearing children. Found on the school's website, its mission is stated, as follows:

The [residential school] is recognized for academic rigor and direct instruction in American Sign Language and English. Through our fully-accredited programs, visual learning environment and strong partnerships with families and communities, our students experience rich language opportunities, develop appreciation for diversity and lead fulfilling lives.

Moreover, the residential school is fully accredited by Western Association of Schools and Colleges (WASC) and Accrediting Commission for Schools and Conference of Educational Administrators of Schools and Programs for the Deaf (CEASD). There are approximately 500 students in total from age 0 to 22, with 52% being male and 48% being female. Approximately 60% of the students are residential (living on campus during weeknights due to their families living too far for a daily commute), while the rest are day students. According to the WASC

report in 2012, there are 43% Hispanic, 34% Caucasian, 10% Asian, 8% African American, and 5% mixed races.

The school offers various educational programs that operate with a strong emphasis in fostering deaf children into competent bilinguals in both ASL and English. All staff and faculty must be proficient in ASL and written English, as well. Such programs offered at the CSD are Early Start and Early Childhood Program (0-6), Elementary School, Middle School, High School, Special Needs, Career Technology Education, Career Center, Work Readiness Program, and Athletics/Physical Education.

The Middle School: The Middle School follows a block schedule, and each grade has different schedules. Mondays and Wednesdays follow the Block A schedule, and Tuesdays and Thursdays follow the Block B schedule. The Friday schedule includes all blocks (shortened classes) and ends at an earlier time for the residential students to take long commutes back home. All 6th Grade students have a slightly different schedule from all 7th and 8th Grade students. Both 6th Grade schedule and 7th/8th Grade schedule (including the A and B block schedules) are shown below in Table 1.1 and Table 1.2:

Table 1.1: Block A and B schedules for 6th Grade

Time	Monday	Tuesday	Wednesday	Thursday	Time	Friday
8:00 – 9:27	1 st Block	2 nd Block	1 st Block	2 nd Block	8:00 – 8:36	1 st Block
9:30 – 10:12	3 rd Block	3 rd Block	3 rd Block	3 rd Block	8:38 – 9:14	2 nd Block
10:15 – 10:57	4 th Block	4 th Block	4 th Block	4 th Block	9:16 – 9:52	3 rd Block
11:00 – 11:45	5 th Block	7 th Block	5 th Block	7 th Block	9:54 – 10:30	4 th Block
11:48 – 12:18	Lunch				10:32 – 11:08	7 th Block
12:21 – 1:06	5 th Block	7 th Block	5 th Block	7 th Block	11:10 – 11:46	Lunch
1:09 – 2:36	8 th Block	9 th Block	8 th Block	9 th Block	11:48 – 12:24	5 th Block
2:39 – 2:56	10 th Block				12:26 – 1:02	8 th Block
					1:04 – 1:45	9 th Block

Table 1.2: Block A and B schedule for 7th Grade and 8th Grade

Time	Monday	Tuesday	Wednesday	Thursday	Time	Friday
8:00 – 8:42	1 st Block	1 st Block	1 st Block	1 st Block	8:00 – 8:36	1 st Block
8:45 – 9:27	2 nd Block	2 nd Block	2 nd Block	2 nd Block	8:38 – 9:14	2 nd Block
9:30 – 10:57	3 rd Block	4 th Block	3 rd Block	4 th Block	9:16 – 9:52	3 rd Block
11:00 – 11:45	5 th Block	7 th Block	5 th Block	7 th Block	9:54 – 10:30	4 th Block
11:48 – 12:18	Lunch				10:32 – 11:08	7 th Block
12:21 – 1:06	5 th Block	7 th Block	5 th Block	7 th Block	11:10 – 11:46	Lunch
1:09 – 2:36	8 th Block	9 th Block	8 th Block	9 th Block	11:48 – 12:24	5 th Block
2:39 – 2:56	10 th Block				12:26 – 1:02	8 th Block
					1:04 – 1:45	9 th Block

Technology at the Middle School: Every classroom in the Middle School is equipped with a SMART Board installed on a wall. There are 15 to 20 MacBook Pro laptops available by reservations to all staff and students in the Middle School. Students' personal devices, such as cellphones and tablets, are not prohibited to use during school hours. There is also a computer lab in a building adjacent to the Middle School building that holds 16 Mac computers and 12 PC computers. In addition, every classroom is equipped with a videophone (VP) that comes with a monitor and a webcam.

My Internship: I taught in the Middle School at the CSD for a total of ten weeks. Instead of having one cooperating teacher as typical for an intern teacher, I happened to have two cooperating teachers. One was a Math teacher and another was a Science teacher. I taught three Math classes and two Science classes, each being 90 minutes long. All classes were taught in both ASL and English. Table 2 shows the number of students in each of my math and science classes.

Table 2: Number of students in my math and science classes

Subject	Grade	Block	Number of Students
6th Math	6 th	2 nd	5
Life Science	7 th	3 rd	5
Physical Science	8 th	7 th	7
8th Math	8 th	8 th	7
Math Intervention	7 th	9 th	4

Since I aimed to teach my curriculum in the Math area, I automatically excluded my two Science classes, which left me my three Math classes to include in the implementation. However, after discussing with my Math cooperating teacher and my UCSD program supervisor, I decided to implement my curriculum in just one of the three Math classes that had four students. I will explain more about this later in this section.

The Math Classroom: The curriculum was implemented in my CT's Math classroom. In the classroom, chairs and desks were arranged in a half-moon shape facing the wall where the SMART Board was installed. Next to the SMART Board was a whiteboard for the teacher, and there were 4 more whiteboards on the opposite wall. Portable, mini whiteboards were also available for students to use. My CT used the Common Core Math textbook by McGraw-Hill as her main guideline for her math lessons. Each student owned a copy of the Common Core Math student workbook. Also, when MacBook Pro laptops were brought in the classroom, each student had their own accounts to log in.

The Students: I implemented my curriculum for four students in the Math Intervention class. For the sake of their privacy in my thesis, I am addressing them by their favorite cartoon characters: Cinderella, Venom, Minnie Mouse, and Batman. All four students were in 7th Grade, but their math grade levels were between Kindergarten to Grade 2, according to their Measure of Academic Performance (MAP) scores. Since their math grade levels were about five grade levels below their actual grade level (7th Grade), they were placed in the math intervention class. However, my CT did not have a readily made curriculum for math intervention to teach those four students. So, she followed the 6th Grade Common Core curriculum in hope to teach them important math skills closer to their actual grade level (7th Grade) by providing heavily scaffolded instruction with a lot of reviews and practices.

In order to get to know the four students that I would teach in my curriculum implementation, I conducted the pre-assessment interview (see Appendix B for the questions), one-on-one with each student. However, I did not interview them all

before the first day of the implementation, due to the odd block schedule in the Middle School. I was only able to interview one student at a time during the 10th Block, only if their 10th Block teacher allowed me to pull the student out of the classroom for the interview. I also gathered some information about each student from other teachers at the Middle School who had known them before.

A descriptive summary for each student is listed below:

1. **Cinderella** is a male residential student. He does not have access to a computer at home during weekends. Among his classmates, he has a good arithmetic skill and can read/write well with support. He likes math only if it does not require a lot of writing, and if it is not difficult. He does not like to write, because he feels that he cannot express well in English. He said that he takes notes sometimes when his teacher is teaching. He loves drawing and is often seen doodling in class.
2. **Batman** is a male day student. He got transferred to the residential school from a mainstreamed program less than two years ago. He considers himself as a hard-of-hearing individual, who can understand Spoken English fluently. Through my observations, he is sensitive to new challenges and is easily aggravated. He has a tendency of spacing out whenever he does not want to cooperate. When asked if he likes math, he flatly said that he likes nothing about math, but he likes to play simple math games on the Internet. He does not like to write and has never taken notes. At home, he is allowed to borrow his parents' computer, only if he finishes his homework. In addition, he enjoys drawing and coloring.

3. **Minnie Mouse** is a female, day student. Like Batman, she got transferred to the residential school from a mainstreamed program less than two years ago. During my ten-week internship, she was often absent, due to her health issues. My CT and I have observed that she might have a type of learning disability since she cannot recall what she learned in the next day, and needs repetitive reviews. She likes math, especially when doing basic arithmetic. She said she does take notes sometimes when her teacher is teaching. She likes to write, mostly about her family. At home, she shares a computer with her brother to do homework. She mentions that she does not dislike drawing, but she will rather do coloring.
4. **Venom** is a male, residential student. He grew up at the residential school, which explains his ASL skill being more progressive than his peers. He often hums while working, saying that humming helps him focus (but his humming often disrupts his classmates who could hear some). He hates math because he gets frustrated when he does not understand and also get easily irritated when he keeps making mistakes, but he enjoys doing math on the IXL.com (the website that my CT uses a lot for online practice). He said in his interview, "I like to learn math and writing, but it is hard because I forget easily the next day." He does not like to write, but is willing to write if he is asked to. He has never taken notes in class, and he mentioned that he prefers class discussion. At home, he has a computer to use, mostly to watch videos on the Youtube.com. Additionally, he loves drawing a lot, and is often seen doodling in class.

Unexpected issues: During the implementation of my curriculum in the Math intervention class, I faced several issues and struggles. First, I used the Math Common Core standards for Grade 7 in my lesson plans, but later found out that their functional math level was between Kindergarten to Grade 2. I had to modify my lesson plans a lot to accommodate the four students.

Secondly, due to my decision to implement my curriculum to only one group of students, I was only able to teach them twice a week (Tuesday's and Thursday's 9th Block), which gave me too little time for my curriculum implementation. There were also other conflicts, such as standardized tests, a school play, and assemblies that further limited the time allowed for my implementation.

Thirdly, I found it challenging to teach the four students, but was reassured by other teachers at the Middle School that those students were a challenging type of students to teach. Those students requires heavily on modeling, reviewing, and reminding. They also have short attention span, which prompted me to chunk my lessons and make use of more class breaks. As a result, a lot of time was consumed that I had to remove two of the three note-taking strategies (the Cornell method and the outline method) in order to make out as much of my curriculum as I could within the implementation. Also, Minnie Mouse was absent often that I could not get anything done from her (for example, if she was absent on Thursday, I would not see her until next Tuesday or Thursday).

If I knew of those unexpected issues, I would have implemented the two other Math classes (5 students in 6th Grade and 7 students in 8th Grade) so that I could collect more observational data to better validate the effectiveness of my

curriculum. With more time allowed or a second chance to implement my curriculum, I would have done better to address those issues and be able to meet all my four goals in my curriculum.

Before implementation

First, I was curious in getting to know my students in my five classes, and wanted to see how they felt about watching videos, working on a computer, and so on. So, I conducted a quick, informal survey by asking my students in all five classes my questions whenever they were available for a minute. I had a total of 28 students, but interviewed 25 students. Table 3 below is the summary of the data collected:

Table 3: Data collected from my quick, informal survey

Questions	Responses	# of Students
Would you rather write or draw?	Write	4
	Either	7
	Draw	14
Would you rather work on a paper or on a computer?	On paper	8
	Either	12
	On computer	5
Would rather do an activity or a worksheet?	Activity	20
	Either	5
	Worksheet	0
Would you rather work independently or in a group?	Independently	4
	Either	13
	In a group	8
Do you like to draw?	Yes	14
	Neutral	8
	No	3
Do you like watching videos?	Yes	23
	Neutral	1
	No	1

By examining the data in Table 3, almost all the students (23 out of 25 surveyed) like watching videos, and most preferred to do an activity and to work in a group. This showed that the students could benefit from the flipped classroom

model. Also, most students were fine with working either on a paper or a computer, but all expressed that they were comfortable with using technology (I was not surprised considering that this is the Digital Age). Interestingly, a high number of students expressed that they like to draw and would rather draw if they do not have to write.

Before the implementation of my curriculum, I had a lengthy discussion with my Math CT about picking one class of students to perform my curriculum. At that time, I thought I just had to implement my curriculum to one group of students, but was informed later on by my UCSD program supervisor that I was not limited to one group of students. My CT also advised me to choose just one class to implement my curriculum because she was concerned about my workload of having to teach two Science classes and three Math classes on top of implementing my curriculum. Nevertheless, I wished that I did implement my curriculum to more than one group of students.

In the discussion with my CT, she said her 8th Grade students in the 8th Block were fast learners and did take notes sometimes. Her 6th Grade students in the 2nd Block rarely took notes, and so they might benefit from my curriculum. Her 7th Grade students in the 9th Block, who were taking the Math Intervention, never took notes, nor were they observed to take initiative in their own learning process. As a result, we both concluded that the four Math Intervention students would benefit the most from my curriculum, since they would be going to high school soon where they would have to learn a great deal of information everyday. The Math Intervention class had no set curriculum, making it easier and more flexible to fit my curriculum timeline. However, my CT warned me that those four students

were very challenging to teach. Still, I contemplated and decided to choose the 9th Block class for the implementation of my curriculum because I hoped to see whether or not those students would gain something new and useful from my curriculum.

After deciding on the group of students, my CT and I discussed on what math topics that the students needed to learn in the following weeks. My CT instructed me to introduce the following topics:

- exponents,
- the order of operations (Parentheses, Exponents, Multiplication/Division, and Addition/Subtraction), and
- expressions and equations (introduction to algebra).

We also discussed the basic math vocabulary that the students should know by the end of the implementation. In my conversation with the English teacher who taught three of the four students in the previous year, I learned that they did not know the words “sum” and “difference.” My CT advised me to focus on a small number of words to teach for my curriculum implementation because the students might feel overwhelmed to learn too many unfamiliar words. So, the key vocabulary introduced in this curriculum, were as follows:

- add, addition, sum,
- subtract, subtraction, difference,
- multiply, multiplication, product,
- divide, division, quotient,
- exponents, and
- parentheses.

Finally, I set to make changes to my lessons to incorporate those math topics and key vocabulary.

Tuesday, April 18, 2016 – Pre-assessment

Today was my first day of implementing my curriculum, and I was excited. I was also anxious about how the four students in the 9th Block (on Tuesdays and Thursdays) would react to me teaching them. Before I could proceed to teaching the first lesson in Unit 1, I wanted to know the students' prior knowledge and abilities to perform tasks relating to basic arithmetic, and thus, I prepared a pre-assessment.

Originally, my plan was to hand the pre-assessment sheets to the students, and let them do them independently. However, after teaching a couple of math classes prior to this first day of utilizing my curriculum, I observed that they did not read nor write much, and needed the teacher support in reading and writing. For that reason, I came up with the idea of creating an interactive video in which I would sign each question in the pre-assessment in ASL. The questions in English were printed on the pre-assessment handouts. Each student could play the video on his/her individual laptop and watch me sign. This way, every student could set his/her own pace, and I would not have to repeat signing the same direction more than once. And more importantly, I would be able to administer the pre-assessment in a bilingual manner – ASL in the video and English in print!

In order to create an interactive video, I used this cool, easy-to-use online tool called Zaption (www.zaption.com). It is a website that allows users to turn a video into an interactive video by inserting interactive components, such as

multiple choice questions, open-end questions, texts, images, and drawings. It is free to use, unless you want to pay for more features and storage.

Figure 1 is what the Zaption video looks like when a student is watching it. Figure 2 is the print copy of the question that I am seen explaining in the Zaption video.

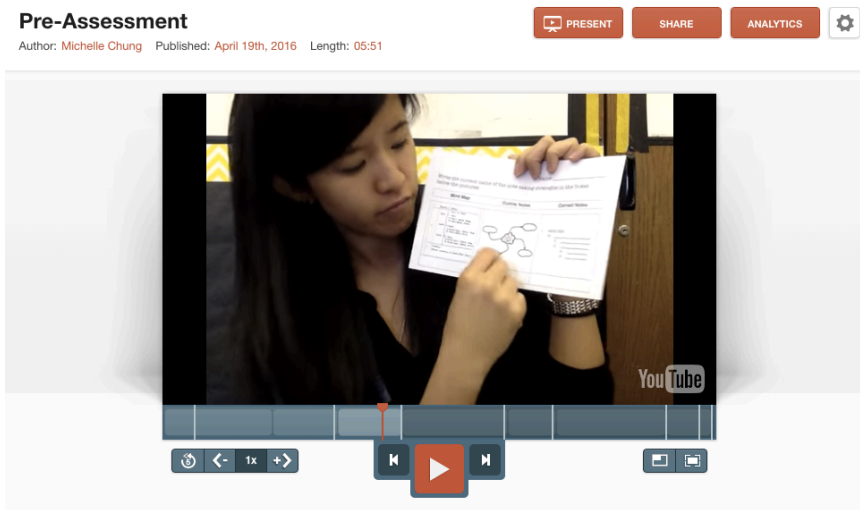


Figure 1: Screenshot of my pre-assessment Zaption video

Name: _____

Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
		<p>I. MAIN IDEA</p> <p>A. _____</p> <p>1. _____</p> <p>2. _____</p> <p>a. _____</p> <p>b. _____</p>

Figure 2: The print copy of a question in the pre-assessment

Another cool feature of a Zaption video is the automatic pausing of a video whenever a question shows up. To illustrate an example, Figure 3 shows what it

looks like when I finish explaining the direction for a problem. The video automatically pauses itself and reveals the sidebar showing the question, which a student has to respond (in this case, they have to click “I’m done!” when they are done with the question). Once he/she submits a response, the video plays on.

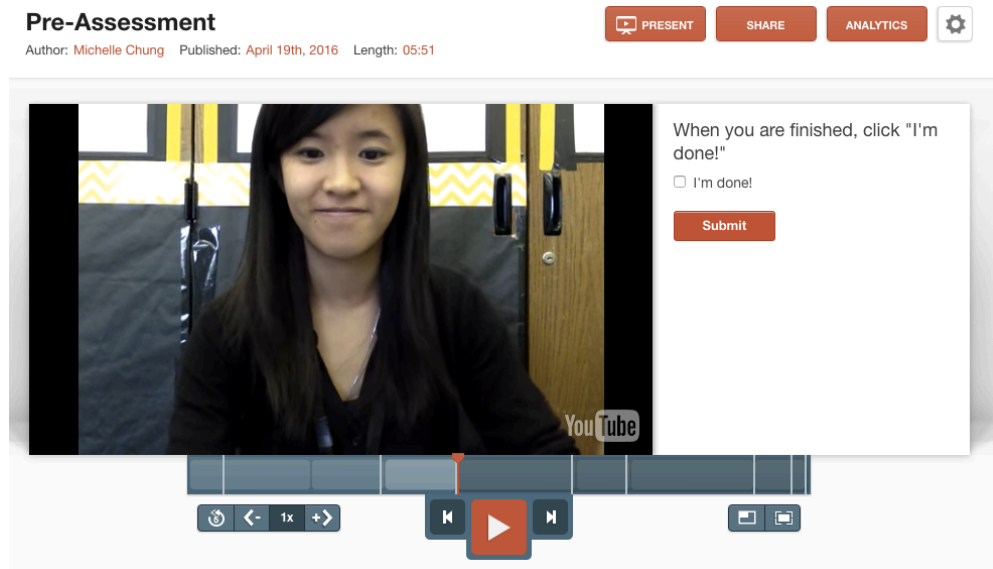


Figure 3: Screenshot of my pre-assessment Zaption video with the sidebar

Prior to today’s 9th Block, I reserved four laptops to be delivered to my classroom (the Middle School had two full-time teacher assistants whose job was to deliver and collect laptops to and from every classroom). An unexpected issue arose when the TA came into the classroom at the beginning of the 9th Block to deliver the four laptops. When she placed them on a desk nearest to the door, the students immediately grabbed a laptop, opened it, and logged in on their own without my consent. That took away my control of the classroom management because I had not had a chance to establish my classroom rules since I was new to the students. I struggled for about 10 minutes to tell them to put away their laptops because we did not need it at the beginning of this lesson, but they refused

to cooperate with me. My CT remarked that the students were unusually mean to me today.

After regaining my control of them, I passed them multiplication worksheets as their warm-up activity due to my CT's instruction (this was not part of my pre-assessment plan). Those students needed repeated practice with multiplication facts. They took approximately 12 minutes to complete the warm-up.

Finally after 25 minutes in the block, I was able to begin my first lesson. I started by explaining that I had a "project" to do as part of my teaching internship, and for the project, I had to teach them my curriculum. I explained to them briefly about my curriculum, and told them that they would do the pre-assessment first. I emphasized that the pre-assessment was not a test, but a way for me to assess their prior knowledge. If they were unable to perform a problem, they could leave it blank or draw a question mark.

Next, I had them log in their laptops and go to their email inbox, where they found the specific link to my Zaption video that I emailed to them. I explained that they were to click the link, watch the video of me and play it to start their pre-assessment. All, except Batman, showed a sign of curiosity of what was to come. When they saw me signing in the video as if I was speaking directly to them, they giggled. Minnie Mouse and Venom said, "It's funny to see two Michelles at the same time."

While Minnie Mouse and Venom proceeded on their own quietly, a problem arose for Cinderella and Batman. Both Cinderella and Batman could not log in, due to some sort of technical issues with their laptops. I made a mental note to be more prepared to face any unexpected technical issue. I sent them both to find the

TA for a replacement, but they came back empty-handed. To make up for their malfunctioning laptops, I had Christo and Batman watch my Zaption video played on the SMART Board. However, Batman appeared to be in a bad mood ever since his laptop did not work. He did not watch the video on the SMART Board nor did he touch the pre-assessment handout on his desk. Instead, he just spaced out. My CT told me to leave him alone, and he would eventually start working.

Minnie Mouse was doing well without struggle, but I noticed that she took a longer amount of time working on each question. Venom appeared to be fine watching the video, but then I caught him switching to another window showing YouTube videos of WWE wrestlers fighting (WWE is shortened for World Wrestling Entertainment). I warned him that it was not the time to watch WWE and to close the window. He groaned and closed the window (but I caught him reopening it again later). Plus, he kept hollering and humming, so loud that I could hear/feel him without my hearing aids on. His hollering/humming became disruptive to his classmates, especially Batman who is hard-of-hearing. I tried telling him to stop hollering multiple times, and still, he persisted. He said, "Humming helps me focus." I informed my CT about his situation with hollering/humming, and my CT was surprised because she was not aware of his humming habit since then.

About 30 minutes passed by since the students started the pre-assessment. Cinderella finished his pre-assessment before his classmates, despite that he started it much later than the others. I asked him what he thought about watching me on a Zaption video, and he responded, "I like watching it because I did not have to write anything." On the other hand, Batman was still not doing anything. I became concerned that, if his current behavior were consistent,

he would not be able to complete much for my curriculum implementation. Venom went to the bathroom, and did not return for quite a long time.

About 15 minutes left until the end of the block, Batman picked up his pencil and started writing on his pre-assessment. Minnie Mouse also finished hers, and she took approximately 50 minutes in total. I observed that she paused the video more frequently and required more time answering each question. Shortly after Minnie Mouse finished, Venom finished his pre-assessment, and so did Batman. It took Batman only about 8 minutes, but I saw that he did not put any efforts since he put a question mark for almost every answer in his pre-assessment. My CT told me that Batman tended to get defensive and uncooperative when he was given something unfamiliar or new.

At the end of class, I was left with many thoughts to reflect on. Originally, I assumed the pre-assessment would not take more than 30 minutes at most, since the Zaption video itself was only about 5 minutes long and there were just 5 problems to do. I was not expecting them to actually answer every question because most were most likely unfamiliar to them. However, I was surprised about the fact that they took the majority of the 90-minutes block to complete the pre-assessment!

Personal Reflection: I thought that maybe the students needed a form of support with time management, such as writing the class agenda for that day on the whiteboard before class. An agenda could help the students know what to expect for the rest of their 90-minutes block. In addition, I made a mental note to myself not to waste time worrying about students not wanting to get involved or to do work when I ask them to. I needed to consider how to best introduce a new

concept to them so that they would not get surprised or threatened they see something unfamiliar, like what happened to Batman.

Furthermore, I realized that the flipped classroom model might not work well for this implementation since a class was 90 minutes long and not all students had an easy access to a computer outside school. I decided that I should use a modified variation of the flipped classroom model, called an “in-class flip.” In an “in-class students are given class time to watch lectures videos and take notes as they watch. Then, then they can do an activity or project for the remaining class time.

CT’s Comments and Feedback: You were good at being patient with the students. You were good at being responsive and flexible to changing your lesson plan simultaneously. You needed to make sure to tell the students that they should not take the laptops at the first place without your consent. If they continue to rebel, use the warning system and after-school conferences that I’ve always used. Also, it is not your fault that Batman was not cooperating today. He had always been a difficult student to work with, and every other teacher who had him felt the same.

Additional Notes: I was thinking of how the four students were going to organize and keep their work done during my curriculum implementation. At the same time, I happened to explore and was fascinated to the concept of an interactive notebook (taking notes in an innovative way that one can manipulate the appearance of the notes in an interactive notebook). My CT told me that I could get four composition books from the supplies room. So, I thought it would be neat if

the students could have his/her own notebook to keep track of what they had learned during the course of my curriculum implementation.

I asked my CT if she had ever encouraged the students to take notes, and she said yes. She said that the students always forgot to bring their notebooks back from home in the past that notebooks became useless. She gave up asking them to take notes after seeing them saying that they constantly forgot to bring their notebooks to class. Because of that reason from her experience, I contemplated that I would make sure to keep the students' notebooks in the classroom at all times. That meant the students would not be The first few lessons in my curriculum would require the students to use their notebooks, and so, I did not want to face the problem when they did not bring the notebooks to class and be unable to carry out my lessons.

Thursday, April 21, 2016 - Unit 1, Lesson 1.1

Before beginning the launch part of my Lesson 1.1, I had the students do a warm-up. I wrote a set of four simple arithmetic problems on the whiteboard. When they came in the class, I asked them to get a scrap paper and solved those four problems. When they all were ready to share their answers, I assigned one problem to each student to show their work. One by one, they came up to the front and explained their work. I gave them compliments and feedback.

Next, I was ready to begin my Lesson 1.1. I told them that I would play a video and I wanted them to explain what they observed. I played a video of cave painting. The students looked somewhat bored or puzzled. I asked them what they thought the video was about. Batman said, "I see a cow." Other students agreed. I asked them more questions to elicit more thoughts from them, but they continued

to give the same response, “It’s a cow.” For example, I asked them, “Why do you think the cavemen painted a cow?” and got no responses.

Suddenly, I realized showing a video of cave painting as an opening was honestly awkward because those students could not relate anything to cave painting, except to tell me the painting was a cow. I was hoping to show them how note-taking took back thousands of years ago. I should have explained that we were going to learn about taking notes and the history of note-taking. I should have known to prepare several other videos showing various types of writing from different countries and historical periods (i.e. Chinese calligraphy, Roman writing, Egyptian writing, etc.). That would have better represented the history of note-taking, but I was unprepared. In the end, I quickly explained to them that people had been writing and documenting important information since many thousands of years ago.

Then I wrote “Note-taking” in a large size on the whiteboard, and asked the students to think about what the word implied to them. I asked them to do a Quickdraw (a quick drawing expressing an idea) on a whiteboard at the back wall, one board per student. At first, they did not understand what they were asked to do. Minnie Mouse asked, “What do I draw?” Other students were equally confused. Because of my awkward launch, they were confused about how the cave painting had anything to do with the word, “Note-taking.” I tried explaining again that they were to draw whatever they THINK the word meant. I tried to avoid giving hints because I did not want them to follow and/or copy my ideas. Finally, Batman said, “You mean I need to draw what I think that word is?” to which I replied yes, and he jumped in glee at the fact that he could just draw.

Although a Quickdraw was supposed to be done in less than 2-5 minutes, the students took about 20 minutes to finish their drawing, which was much longer than I expected. At first, I did not want to tell them to hurry up because I felt contradicted with wanting to allow the students go with their own pace. Still, as 20 minutes went by, I became impatient. I tried telling them that they had two minutes left to finish their drawings, but they ignored me and continued drawing.

A problem came up. Venom started causing problems. He walked over to other students' whiteboards and scribbled a grade (i.e. A-, B+, F) on them. His action provoked Batman into fighting with him and scribbling on Venom's whiteboard. I stopped them and told Venom to focus on his drawing and leave the others' alone.

Finally when they were done drawing, I asked them to present to the class what they had drawn. Venom drew a boy with a talking bubble that said "note-taking." I asked him to explain, and he said, "I don't really know. Honestly, I just made it up."

Unable to get Venom to say more, we moved on to Cinderella's drawing. He drew two girls facing each other, and one was holding a written paper. He said, "Note-taking is writing/reading to communicate between a hearing person and a deaf person. The woman on the left is deaf and the woman on the right is hearing. They write back and forth." I also saw him write "Note-Talking" at first, but he corrected it to "Note-Taking" when he was working on his drawing. Thus, Cinderella thought note-taking was a form of communication between a deaf person and a hearing person.

Batman drew a cow holding a book on one of its hands and two thinking bubbles. One bubble read, "I'm taking what you are going to do about it," and the other bubble said, "This is mooooo good!" He presented to the class, "Note-taking sounds like no talking," which explained why he drew thinking bubbles. "This is mooooo good! Mooooo good sounds like soooo good because he is a cow," he continued, and I complimented him for thinking outside the box. I thought it was interesting how Batman used his phonic and orthographic knowledge to interpret the word, "Note-taking."

Minnie Mouse drew a classroom that had a whiteboard with math scribbled on it and four desks with each having a writing paper and a pen on top. She signed, "Note-taking is writing down math and whatever is on the whiteboard. We copy them and learn from them." Compared with her peers, I thought Minnie Mouse's interpretation was the closest to the meaning of the word, "note-taking."

I took pictures of the students' Quickdraws to save for evidence of students' work (see Appendix C). I also informed the students that they would get a printed copy of their Quickdraws for them to keep.

After the Quickdraws, I gave each student an envelope containing cutout examples of the three note-taking strategies: Cornell notes, outline notes, and mind maps (see Appendix B). I instructed them to examine the examples and sort them into three piles based on their similarities. The students did not understand the request. Worried that I was not clear with my instructions, I repeated a few times with modeling a couple of examples.

Eventually, the students started sorting. At first, Batman and Venom complained there was "too much English" (some examples had a lot of writing) and

exclaimed that this activity was “too hard and boring.” I told them that they did not have to actually read everything in the examples, but to look at the examples as if they were pictures. I modeled one-on-one with Venom. He understood and was the first to complete the sorting activity.

Batman matched the examples in pairs. I realized he did not get that he was supposed to sort them into three piles. I informed him that he got the right idea, and needed to match pairs until he had three piles. I modeled a couple of times, and he picked up from there.

Cinderella showed no interest in this activity and did not sort his examples. However, he explained to me in ASL that he noticed some similarities between the examples of mind maps and the examples of outline notes. I tried encouraging him to complete the sorting activity after commenting that he had the correct idea, but he did not cooperate, and he seemed bored.

Minnie Mouse struggled with the sorting activity, and expressed that she did not know where to start. I picked up one example, and asked her to find other examples that looked similar to the one I was holding. She searched and chose one correctly. I repeated a few times with her until she was able to carry on the rest on her own (see Figure 4).

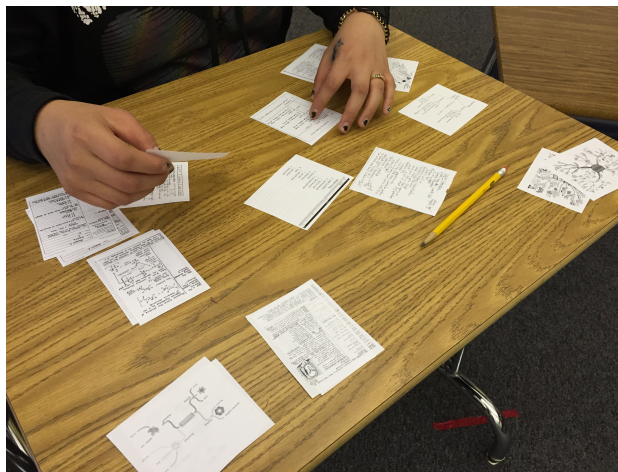


Figure 4: Minnie Mouse doing the sorting activity

After about 20 minutes, they started losing focus and were moving around the classroom. The sorting activity dragged on for far too long due to repeated explanations, lack of attention, and repeated reminders to work. Only Venom and Batman finished the sorting activity. I decided to cease the individual sorting activity and called the students to gather in front of the whiteboard. I drew three large circles and evenly distributed the examples to each student. I had them tape the examples in the correct circle on the whiteboard (with struggle at getting them to stop fooling around). They got most right, but I noticed they had a bit difficulty telling apart between Cornell notes and outline notes.

Next, I began introducing the names of the three note-taking strategies and their main features. However, when I tried to teach, the students did not pay attention, causing me explain over and over. Cinderella fell asleep, and Minnie Mouse could barely stay awake. Venom was humming and hollering. Batman kept moving in and out of his seat. Soon, I saw that it was pointless to continue this lesson when they all had lost their motivation to learn. There was only 10 minutes

left in the block, and so, I decided to stop there. Figure 5 was what the diagram with examples of notes taped on the whiteboard looked like:

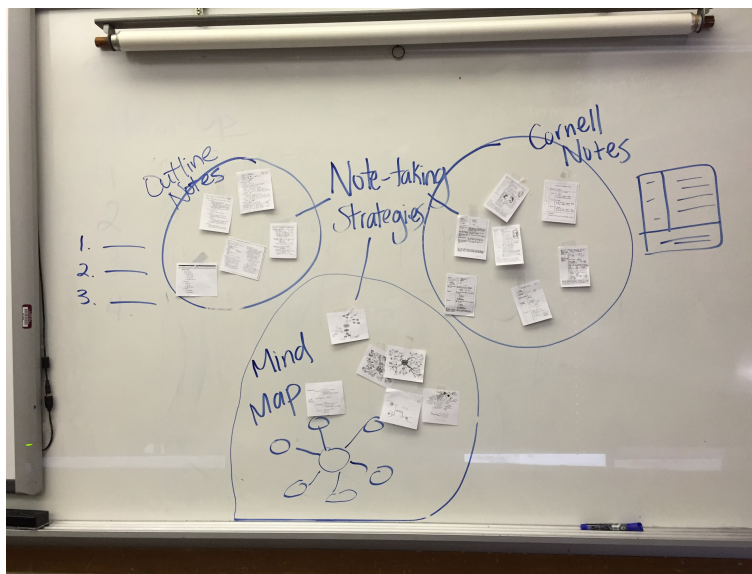


Figure 5: The diagram on the whiteboard

Before the class block ended, I showed the students my composition notebook that I made to show them as an example. I told them they would be creating their own notebook in class tomorrow and that they would get to draw their front cover. Venom signed, “Draw? I will draw tomorrow?” I clarified to him that he could draw only if he would finish what he needs to do. Cinderella cheered because he loved to draw. Minnie Mouse and Batman were unresponsive.

Personal Reflection: I realized a major mistake on my teaching part. I carried on with this Lesson 1.1 without explaining to the students the purpose of doing this. I did not make it clear with them why I was going to show them a video of cave painting. They probably were thinking, “Why are we watching about cave painting when this is a math class?” or “Why even bother talking about taking notes?”

But after thinking and discussing with my program chair, I realized that the real question here was “Do the students understand what note-taking means and the purpose of taking notes?” If so, it made sense that my attempt of using the video of cave painting utterly failed to give the students an idea of what note-taking was because they had no prior knowledge of what note-taking was. They probably had never seen or heard of cave painting neither!

Then, I saw that what the students needed in my classroom was this learning theory called authentic learning. I felt that authentic learning would be more applicable for those students to make connections to new knowledge since they had not shown much of abstract thinking. They were not able to see the relationship between the history of note-taking and the purpose of note-taking because it was not relevant to them. Besides, it is generally difficult for anyone to really understand something that is not relevant to one’s past experience and prior knowledge.

Hence, I could have used simple examples in real life when we took notes. Such examples could be writing a memo, making a food shopping list, writing a phone number, or writing an address of a friend’s place to go to for his/her birthday party. Those were some actions of note-taking that the students could have been doing in everyday life without realizing. Using those examples could have potentially helped the students grasp the purpose of note-taking. For example, I could do a role-play of writing down something and ask them why I am writing it down. Thus, using authentic learning would help the students make the connection to academic note-taking.

Furthermore, the Quickdraw activity was successful because they were engaged in drawing out their thought about the word “note-taking.” However, it consumed a lot of time because they never did a Quickdraw before. They were not yet taught how to do a quick drawing (no coloring, no tiny details, no shading, etc.). The outcome would have been different if they had previously done Quickdraws.

Getting them to pay attention was a big struggle I had as a teacher for this class. I admitted it was frustrating and difficult to explain when not all of them were paying attention at once. I had to repeat at least once every time I said something. The other students also felt frustrated when they had to repeat whenever someone did not look at them when they were signing.

I also learned the students had a very short attention span (about 10-15 minutes span), and they got bored of one thing quickly, too. When I tried to move on to the next activity in this lesson, they were already checked out of learning. It was also my fault that I forgot to give them a 5-minute break in the middle of the class (I could have done it in between the Quickdraw activity and the sorting activity). I was stressed out due to the class time running out.

CT’s Comments and Feedback: Great start by having students do warm up on what they learned last Tuesday, having each student do one problem on the whiteboard, and engaging students by discussing together about the cave paintings! It sometimes helped Batman with his behavior by answering questions and doing problems he thought were easy for him. It helped him feel good about himself.

Using the whiteboards on the back wall seemed to be a perfect ongoing activity for them. For example, write math problems on them for students to answer

when they enter the classroom or during guided practice. They were very motivated! Standing helped make them more involved as well. Let's brainstorm together how to get them to let go the whiteboards and markers immediately when it is time to move on to the next lesson section if you want to use the whiteboard activity again.

The category sorting activity is a great idea! Demonstrations are critical for students at a low-grade level. Showing an example (your composition book) of what you expect from during note-taking sessions was perfect!

Friday, April 22, 2016 - Unit 1, Lesson 1.1 Continued

Since today was Friday, the class time would be only 36 minutes long. Today, the students would start making their own notebooks. Prior to the 9th Block, I prepared a large envelope for each student. It contained a small composition notebook, Table of Contents template, yesterday's examples of notes, a checklist, a scissor, a glue stick, and the picture of their Quickdraw that they drew yesterday. I prepared them in advance to save the time and hassle of passing out the items, one by one, to the students during class.

Then I remembered my CT's feedback to me stating that "demonstrations are critical for students at a low-grade level" (from CT's feedback from April 12, 2016), I realized they might need to look closely to the pages in my sample notebook for guidance. To make my pages easily accessible to them, I took pictures of every page in my notebook (glued and colored) and uploaded them on my Blendspace page (see Appendix B to see an example). Blendspace is a neat website where I could upload a group of resources and share the link to anyone. Then I emailed the link to them and reserved four laptops for them to use in class.

When the students came in, I told the students that they were going to create their own note-taking notebook that would be used throughout my curriculum implementation. I noted that everything they would see on my pages was what they had learned yesterday, and that the pictures of the pages in my sample notebook were provided as a guideline. They could customize and color their pages in any way they wanted, but they must follow and complete the checklist of what had to be included on each page. The checklist was inside the envelope given to them. I handed them their envelopes, and they went to work on their notebooks independently (each had their own laptop logged in). On the side note, Minnie Mouse was absent.

Unfortunately, a technical issue came up again. Batman's laptop took a very long time logging in that the log in was unsuccessful, causing him to become upset. I had to persuade him that he could use my actual sample notebook, instead of the pictures on his laptop. It took him quite a while to finally get started on working by having me sit next to him on his request. However, he barely completed a page in his notebook today.

Another struggle I had was getting the students to finish what they needed to do before moving on to drawing and coloring. Venom and Cinderella wanted to draw on their front page first. I had to repeatedly instruct them to finish creating their other pages first, but they continued to focus on drawing on their front page until the class ended. In the end, Cinderella and Venom completed no more than two pages.

To sum up my observations for today, they did not look thrilled about the fact that they had to write on the pages in their notebooks. Venom was too eager

to focus on designing his front cover, ignoring the contents about the note-taking strategies. Batman worked at a much slower pace than the others, that in 36 minutes, he only did half of his Table of Contents page. Cinderella did get some work done, but he did not look motivated.

Personal Reflection: I realized how slow their pace had been going since the first day of the implementation. At this rate, I began to have doubt that I would be able to get much done with my curriculum. I was also concerned that making the notebook might not be so interesting for the students at all. My concern now was the amount of time needed for my curriculum to make good progress, considering their working pace, short attention span, and especially the lack of intrinsic motivation to work. Moreover, I could only teach them twice a week (excluding the short Friday class). Things would have been more productive if I could get to teach them for a shorter period of time, five times a week.

My CT's Comments and Feedback: Maybe teaching them three note-taking strategies was too much for them to process in one class. For those students, you should try to teach them one thing at a time. On the other hand, the notebook was a neat idea.

Tuesday, April 26, 2016 - Unit 1, Lesson 1.2

Due to time constraints, I decided to set aside the teaching of two of the three note-taking strategies - the Cornell method and the outline method, from this curriculum implementation. My CT and I agreed that teaching the mind mapping method would be a good start for the students to become accustomed to taking notes. It was the easiest to learn compared to the other two strategies.

Hence, today I taught them an example of a mind map. To make drawing a mind map interesting (or so as I thought it was), I used my fingers and hands to trace a mind map. I traced my hand on a paper and wrote “Operations” in the middle of my palm on the paper. Then I wrote “Addition,” “Subtraction,” “Multiplication,” and “Division” in each of my fingers (see Figure 6).

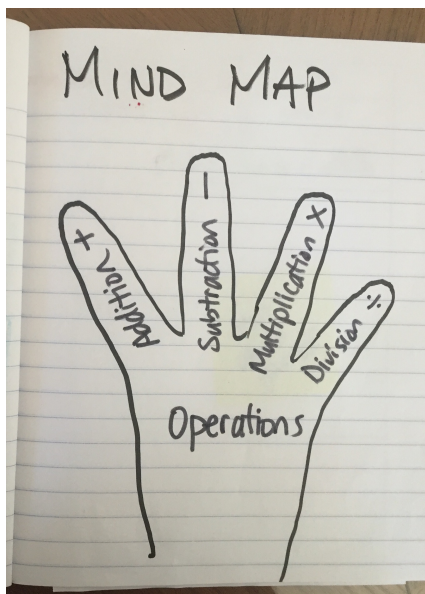


Figure 6: My drawing of the hand-shaped mind map

Cinderella gave a skeptical look as if to think taking notes could not be this creative. Venom said, “That’s it?” with a realization that a mind map could be so simple, yet meaningful. I explained they could use their creativity on how information could be recorded on the paper. I was hoping they would see that there are unlimited ways to draw a mind map, and using our hands was just one way. I showed them an example using our hands because I felt that hands are an important symbol in our Deaf culture. I asked the students to try drawing the same mind map that I just showed them. Within about five minutes, they finished drawing their hand-shaped mind maps (see Appendix C).

Next, I attempted to teach more of my Lesson 1.2, but ultimately failed due to the students misbehaving and mistreating each other. Cinderella, Venom, and Batman had been holding grudge against each other, and on top of that, they were stuck being in the same classes all day and every day. Subsequently, I had to pause my lesson and conducted a serious conversation with the students about their behaviors and work ethics.

Personal Reflection: I was disappointed that I could not get to teach most of the Lesson 1.2 today, but at the same time, I felt that I did the right thing. I felt it was necessary to tackle down the students' social issues each other before it escalated further and also to reaffirm my role as a teacher and the students' role as students.

My CT's Comments and Feedback: No comments/feedback for this day.

Thursday, April 28, 2016 – No Lesson

I did not implement a lesson from my curriculum today because the students required a lot of reviewing of previously learned math concepts in order to get them more prepared for their MAP tests that would occur next week. Also, Minnie Mouse was absent today.

Friday, April 29, 2016 – No Lesson

My CT was absent today, and thus, a substitute teacher had to be present in the classroom for me to implement a lesson. However, my students were forced to be relocated to the computer lab, and therefore, I could not implement a lesson today.

Tuesday, May 3, 2016 – No Lesson

Due to the students taking their MAP tests during class, I did not implement a lesson today.

Thursday, May 5, 2016 – Lesson 1.2 Mini Lesson A

Prior to today's 9th Block, I had a discussion with my CT on improving my instruction with the four students. I came to the realization that I might have been going too fast for the students from the start that I already lost them at the beginning of my curriculum implementation. In terms of Vygotsky's ZPD theory, I set my level of teaching far too high up outside the students' ZPD. I was wrong to be quick to assume that a mind map was so simple to understand and to create at the first glance for someone who had never drawn a mind map before. Maybe that could explain why the students had not been showing enthusiasm in participating in my lessons since I started implementing my curriculum.

So to get in the students' ZPD, I had to take a few steps backwards to help them understand the point of taking notes. That is, I needed to create a much more structured mini lesson to teach the students one specific task that might not be as simple to them as it was to me, such as drawing a mind map. They needed a step-by-step instruction on how to draw a mind map with the teacher's modeling. As my CT had advised me before, students in all grade levels, especially those at lower levels, required more explicit modeling, such as physically demonstrating an activity before letting them proceed on their own.

Hence, I decided that I should create and implement a mini lesson on how to draw a mind map. So, I researched a bit more on mind maps, and stumbled upon learning about the inventor of mind mapping, Tony Buzan. Tony Buzan was

the one who popularized the technique of mind mapping in the 1960's, and published many books about mind maps. In one of his published books, "The Ultimate Book of Mind Maps," he deconstructed the making of a mind map into seven, straightforward steps. The seven steps are as follows:

1. **Start in the CENTRE of a blank page turned sideways.**
Why? Because starting in the centre gives your Brain freedom to spread out in all directions and to express itself more freely and naturally.
2. **Use an IMAGE or PICTURE for your central idea.**
Why? Because an image is worth a thousand words and helps you use your Imagination. A central image is more interesting, keeps you focused, helps you concentrate, and gives your Brain more of a buzz!
3. **Use COLOURS throughout.** *Why? Because colour are as exciting to your Brain as are images. Colour adds extra vibrancy and life to your Mind Map, adds tremendous energy to your Creative Thinking, and is fun!*
4. **CONNECT your MAIN BRANCHES to the central image and connect your second- and third-level branches to the first and second levels, etc.** *Why? Because your Brain works by association. It likes to link two (or three, or four) things together. If you connect the branches, you will understand and remember a lot more easily.*
5. **Make your branches CURVED rather than straight-lined.**
Why? Because having nothing but straight lines is boring to your Brain.
6. **Use ONE KEY WORD PER LINE.** *Why? Because single key words give your Mind Map more power and flexibility.*
7. **Use IMAGES throughout.** *Why? Because each image, like the central image, is also worth a thousand words. So if you have only 10 images in your Mind Map, it's already the equal of 10,000 words of notes!*

(Buzan, 2006)

I immediately saw the usefulness of Tony Buzan's seven steps to teach the students how to make a mind map. I made a simple PowerPoint slideshow (see

Appendix B) showing the seven steps, and developed the short lesson plan for this mini lesson (see Appendix A) to be implemented today at the 9th Block.

At the beginning of the class, Venom and Cinderella were pulled out of the classroom to take their STAR assessment for math (STAR is an acronym for Standardized Test for the Assessment of Reading). Minnie Mouse was present today, but she was not feeling well and went to the nurse's office, missing the whole block. So, I was left with only Batman to teach my mini lesson today.

Before I could implement my mini lesson, I had to work with Batman on his assessment for his IEP goal (IEP stands for Individualized Education Plan). I started with having a few warm-up problems on the whiteboard, and Batman went on to solve them. He appeared especially motivated in working, saying that those math problems were easy. Then, I had him to complete a worksheet that would be used as his assessment evidence.

While he was working on his worksheet, I decided to use the time to draw my mind map about myself. My CT and I agreed it would be easier to make a mind map about oneself for the start and to keep it very simple. The mind map would be about a student and have three branches – family, favorite food, and favorite hobbies. While I was drawing out my mind map on a large poster chart, Batman got interested in knowing what I was doing. He asked, "What are you doing?" I responded, "I am making my mind map about myself. This is what a mind map looks like." I asked him if he would like to make one himself, and he nodded. I was thrilled that I finally got Batman interested. I told him that he could join me after he was done with his worksheet, and he agreed.

Within 10 minutes later, he was done with his worksheet (which was an unusual sight for me during my internship). I invited him to watch my PowerPoint slideshow of the seven steps. He appeared to be paying attention well today, and I complimented him. When I was on the 5th step that stated to make the branches curved rather than straight-lined, Batman signed, "I want to do straight lines, not curved." I responded that it was up to his preference on how he wanted to draw the branches. After the slideshow, I asked him if he could go ahead and make one about himself, but he said, "I want to see you make your mind map first." So, I gladly remade my mind map while thinking aloud every step (talking/signing out what I am thinking before putting forth my action), and Batman observed (see Appendix B for my example of a mind map).

Now it was Batman's turn to make a mind map, but he wanted to make a PowerPoint slideshow instead of making a mind map. We compromised that he must make the mind map first, and then use the mind map as a guideline to make his PowerPoint slideshow. He agreed and made his mind map using color markers (see Appendix C).

Soon after, Venom and Cinderella entered the classroom and quickly showed an interest in my mind map, questioning me about it. I told them that we were going to make a mind map today and presented the same PowerPoint slideshow that I showed to Batman earlier. Cinderella exclaimed, "This is so easy! I can do this quickly!" I saw Venom signing to Cinderella, "This is better than math! I rather do this than math!" I was glad to see the students showing a motivation to do something, especially after many days of struggling to motivate them.

Both Venom and Cinderella wanted to use the laptops to print the pictures of their family members to add to their mind maps. I thought their idea of printing and pasting pictures was great! They were making use of multimedia! Venom drew his mind map using a pencil first, and then he outlined it with color markers (see Figure 7). Cinderella did the same way. I observed them excitedly talk to each other about their family members, their favorite food, and favorite hobbies.

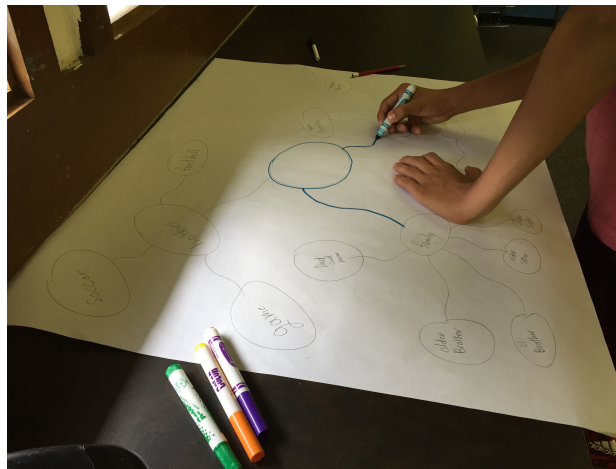


Figure 7: Venom making his mind map

Personal Reflection: Today, I noticed that when using prior knowledge to apply to doing something new, talking and sharing about oneself was one effective way to do. Venom had always been expressing how much he disliked math, and often protested against doing anything that involved math. But today, he was willing to make a mind map because I told him to talk about himself. That got him to open up to applying what he had just learned in the mini lesson.

Similarly, Batman used to become defensive whenever he faced something unfamiliar, but today, he participated wholly and talked about mind maps. He even suggested an alternate option to meet the same objective of the mini lesson!

Now, I wished that I had introduced the concept of a mind map by using the students' prior knowledge about themselves first before transferring to their prior knowledge that involved math. That way, they would become more willing to learn something new like the mind mapping method. I also realized after today that I had set my teaching pace too fast for the students from the very beginning. Maybe they were flustered when I began my curriculum that they became resistant, especially with the fact that they were still getting used to me as their teacher.

As a result of today's implementation, I learned that a very structured lesson and a lot of modeling worked more effectively for those students. It was evidently more successful for them to focus on one small task with clear steps to follow, like Tony Buzan's seven steps of making a mind map.

My CT's Comments and Feedback: Remember that with these students, do one thing at a time slowly. Also if you want to give them homework, make sure to never give them homework if they do not understand a lesson.

Tuesday, May 10, 2016 – Lesson 1.2 Mini Lesson A continued

Batman continued working on his PowerPoint slideshow. I saw him walking back and forth from his desk to the place where he left his mind map to look at what he wrote down. It was good to see Batman using his mind map as a guideline in making his slideshow. Making a PowerPoint slideshow was not part of Lesson 1.2, but he took the initiative to ask me if he could make a slideshow, and so I let him do it. My CT told me to leave him to continue on working because we did not want to break his focus.

Cinderella finished his mind map today. Earlier, I observed him pondering on what hobbies he liked to do, and when he thought of one, he added it to the

“Hobbies” branch. As a result, I could safely say that he understood how to make a mind map. I also asked him, “What is this strategy called?” and he responded, “Mind map.” Also, Venom completed his mind map.

Unfortunately, I did not enough class time today to teach the next lesson, which was Lesson 2.2 Mini Lesson A (teaching how to watch an instructional video). I had to skip Lesson 2.1 due to time constraints. Also, I decided to defer and move Lesson 1.3 (making a student-generated rubric) to after Lesson 2.2. I thought it would be better for the students to first make a mind map from watching the video because they had just learned to make it. Then in Lesson 1.3, I would ask the students to compare their mind maps and my examples of mind maps (I would purposely make a couple of messy, illegible mind maps and a couple of colorful, neat mind maps). They would rate whether a mind map was “poor,” “good,” or “great!” and explain why. Then, with my support, they would generate a rubric that could be used for their self-evaluation.

Thursday, May 12, 2016 – Lesson 2.2 Mini Lesson A

In preparation for implementing Lesson 2.2 Mini Lesson A today, I created another Zaption video that teaches the students a number of the common math words. In the video, I included the ASL signs and English words for the commonly used math words that my CT and I felt the students should know. Those words were: operations, addition, add, sum, subtraction, subtract, difference, multiplication, multiply, product, division, divide, and quotient. Note those words were part of the key vocabulary that my CT and I determined before implementation. The main idea of this Lesson 2.2 Mini Lesson A was to watch the video and take notes using the mind mapping method.

Today at 9th Block, all three students were present in the classroom, except Minnie Mouse. She was absent again. Venom needed more time to work on his independent project for the Middle School end-of-year showcase, and so I allowed him to work independently. That would make it easier for me to implement Lesson 2.2 Mini Lesson A with just two students, Cinderella and Batman.

I asked Cinderella and Batman to sit with me, side by side, so that they could watch me model them how I watch, pause, and play the video and draw my mind map, but Batman refused to sit next to me. He said, "I don't want to watch it! I want to work on my P.P. slideshow!" I tried to reason with him to join with me, and waited patiently until he agreed to join.

Before starting a mind map, I quickly reviewed the seven steps of making a mind map. "What do we do first?" I asked Cinderella and Batman. Cinderella responded, "Circle in the middle!" and continued to explain all seven steps. Next, I had them observe me actively watching my Zaption video and thinking aloud what I was thinking. For example, when I saw a new word appearing in the video, I thought aloud, "Oh, a new word! I think it is important that I should write it down so I will remember it later. I am pausing the video now so I can look down to record the word. I don't want to miss out if the video keeps on playing!" I paused it and wrote it down in my mind map. Then I continued the video. Halfway through the video, I sensed that Cinderella was ready to try on his own because he responded correctly to all my quick questions during the lesson.

On the other hand, Batman was quiet the whole time, as if he did not want to be part of the lesson at all. When I let Cinderella go to work on his own, Batman

asked again if he could work on his slideshow. I figured he would not draw a mind map if I told him no, and thus, I let him go to work on his slideshow.

I went to observe how Cinderella worked. First, he watched the whole Zaption video without writing down anything. I asked why he was not writing down anything, and he said, "I want to watch the whole video first, and then it would be easier to take notes when I replayed the video." I was impressed with his way of thinking. Then, he did replay the video and drew a mind map correctly (see Figure 8 and see Appendix B for his final work).

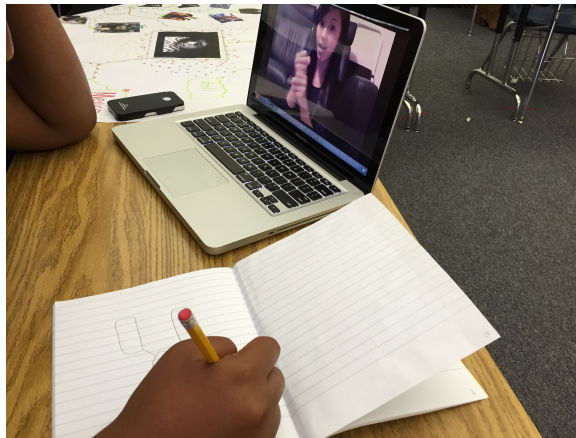


Figure 8: Cinderella drawing a mind map while watching my Zaption video

After I was done with Cinderella, I went to implement Lesson 2.2 Mini Lesson A again with Venom, who had been working independently on his math project. I did the same with him as I did previously with Cinderella and Batman. Venom responded positively to all my quick questions, such as "What should I do next?" and "What should I write down here?" during my modeling. Soon, I was able to let him go to watch the video himself. As he watched it, he paused to write a word and played the video after writing it down, repeating the process throughout the video (see Figure 9).

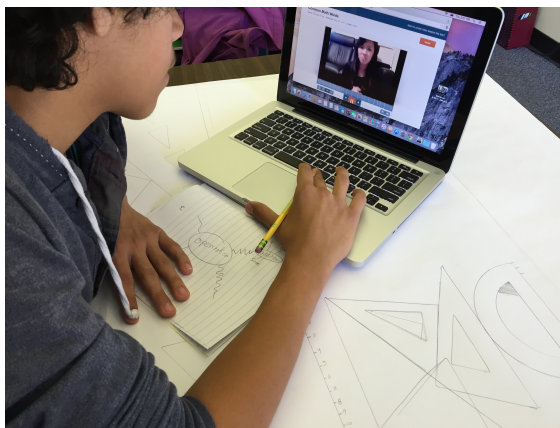


Figure 9: Venom taking notes using the mind mapping method

As a result of today's lesson, only Cinderella finished his mind map. Venom only finished half way because he had to leave the classroom to deal with his personal issue with another teacher. Batman did finish his slideshow and emailed it to me at the end of class.

Personal Reflection: Working with Batman had been a real challenge, and he could be very stubborn. He spent too much class time browsing the Google images for a good picture to insert in his slideshow. I tried encouraging him to speed up his process by telling him that he must email me his slideshow as an attachment by the end of class. I was still figuring out how to build a teacher-student relationship with him, and needed more time.

My Program Supervisor's Observations and Comments: You worked with two boys using the videotape you made of yourself. You showed the students how to make a mind map from the video. It was related to operations in math. One student was not compliant, but eventually joined to watch the video. Then they were to watch the video that you sent via email and individually make a mind map based on the video. You monitored the students. Then you worked with 1 student individually. Used the video to show how to make a mind map from the information

on the video. You modeled how to make the mind map with the student. After he understood, you asked him to watch the video himself.

Math class went well. You have a great teacher presence. When the student didn't want to join you, you were able to handle it well. He finally joined you for the activity. Terrific! Videotape seems like a great way for students to learn. Your guidance helped them learn how to take notes and make a mind map in a positive way. Great!

Tuesday, May 17, 2016 – No Lesson

The students had to work on their math review package to prepare for their Spring final exam that would occur next Tuesday. Reviewing the math concepts that would be on the final exam required the entire block. Thus, I could not implement a lesson. On an additional note, Minnie Mouse was absent today.

Thursday, May 19, 2016 – Post-Assessment

The last day of school was coming near, and I had not had a chance to continue on my curriculum implementation. Yet, I wanted to see if at least one student might show a slight improvement in the post-assessment when compared with the pre-assessment. Since Cinderella was the only one who fully completed Lesson 2.2 Mini Lesson A, I went ahead and gave him three of the five post-assessment problem sheets (see Appendix B). I excluded the other two problems because I had not taught those math concepts/skills required for the students to be able to perform those two problems. Cinderella looked at them and signed, "Easy!" He completed them without struggle. Note that I allowed him to use the mind map that he created in his notebook on Thursday, May 12 for the problem involving common math words.

In addition, I had a brief conversation with Cinderella about how he thought about my Zaption videos. I asked, “How do you like my Zaption videos?” He signed in ASL, “I like them. I like that the video paused itself for me when a question shows up on the side.” Then I asked if he would watch them again to relearn a concept, and he said that it depends on what a video is about. He would watch it again if he thinks it is interesting. I also asked if he had any comments or feedback about my Zaption videos, but he had none.

Tuesday, May 24, 2016 – No Lesson

Due to the students taking their Spring final exam, I did not implement a lesson today.

Thursday, May 26, 2016 – No Lesson

There was no 9th Block class today because of the Middle School’s Awards assembly, and thus, I could not implement a lesson.

Tuesday, May 31, 2016 – No Lesson

The students were required to work on fixing their final exams for extra credit as well as to do other tasks that they had to do before the last day of school. Therefore, I did not implement a lesson.

Thursday, June 1, 2016 – No Lesson

There was no 9th Block class today because of the 8th Grade Graduation assembly, and thus, I could not implement a lesson.

After Implementation

After my curriculum implementation, I discovered six things that had me wishing to go back in time to do those five things. First, I wished that I did

implement my curriculum in my other math classes so that I could collect ample data to produce a more valid evaluation of my curriculum.

Second, I should have done all my pre-implementation interviews individually with my students before starting the first lesson in the curriculum. Instead, I did each student on a different day since it was difficult to find an available time to a one-on-one conference entirely in ASL. Two students' pre-assessment interviews occurred after I began the first lesson of my curriculum.

Third, I forgot to take pictures of Venom's and Cinderella's finished mind maps about themselves that they did in Lesson 1.2 Mini Lesson A on May 5 and 10, 2016, for evidence of students' artifacts. I realized this after putting together the students' artifacts in the Appendix C after the implementation.

Fourth, I somehow forgot to have Venom to do the post-assessment (same three problems that Cinderella did), which could have been a crucial piece of evidence in assessing Venom's academic growth in this curriculum implementation. It would also be useful for the evaluation of my curriculum.

Fifth, I wished I did assess the students' understanding of the key vocabulary in ASL for the pre- and post-assessments. For example, I should have shown them the symbol of multiplication and asked them to sign the math word for it as well as to give me an example in ASL form. I could videotape the students' ASL responses for the pre-assessment and compare with their ASL responses in the post-assessment. That way, I could assess their ability to utilize the mathematical language in BOTH ASL and English. However in my curriculum implementation, the pre- and post-assessments only had the students read and

write the math words correctly in the blanks, which only assessed their knowledge of the key vocabulary in English.

Sixth and lastly, I did not have conversations with Venom, Batman, and Minnie Mouse asking about what they thought about my Zaption videos. Now I could never know how they really felt about my curriculum, my lessons and the videos I made.

IX. RESULTS OF THE EVALUATION

My curriculum had four goals, developed to assess students' achievement. The first goal was *to provide students note-taking strategies to improve their note-taking skills*. To determine whether or not this goal was met, I monitored and observed the four students' activities during class. I also checked their finished work. Three out of the four students did make a full mind map successfully. Batman completed a mind map about himself in Lesson 1.2 Mini Lesson A (implemented on May 2, 2016). A picture of his work is in Appendix C. Both Cinderella and Venom were observed to understand how to make a mind map and successfully drew out a mind map using the mathematical words related to operations (implemented on May 12, 2016). In addition, Cinderella correctly named all the three note-taking strategies in his post-assessment (see Appendix C). This showed that even though he did not have a chance to take notes using the outline method and the Cornell method, he was able to recognize those three ways of taking notes. Although I was only able to teach one out of the three note-taking strategies, I could safely say the first goal was partially met, confirmed by my observation notes and students' artifacts.

The second goal was *to improve students' ability to watch instructional videos with active listening skills*. For this goal, the students watched my Zaption video about the common math words and made a mind map while watching it (implemented on May 12, 2016). Cinderella was the only one who completed Lesson 2.2 Mini Lesson A, and his mind map correctly laid out all the common words shown in the video. Also, Cinderella expressed that he liked watching the Zaption video that I made, and he watched it more than twice. Venom finished just

half of his mind map. Based on my observations, he was able to watch and listen actively because he paused the video every time he needed to record a word. As for Batman and Minnie Mouse, I did not have sufficient data to determine the outcome of this goal for them. Thus, since two out of the four students met this goal (for one out of the three note-taking strategies), I could say that the goal was partially met, confirmed by my observation notes and students' artifacts.

The third goal was *to increase students' metacognitive skills in math problem solving through the use of thinking-aloud strategy*. Due to time constraints and behavioral issues of the students, Unit 3 lessons were not implemented, and therefore, this goal was not met.

Lastly, the fourth goal was *to encourage students to utilize their math academic language in both ASL and English*. Admittedly, I did not have much valid evidence to determine whether the four students did meet this goal, due to time constraints. Out of the four students, only Cinderella completed the post-assessment at the end. By comparing his post-assessment results with his pre-assessment results, he wrote the math words correctly in his post-assessment, showing that he was able to identify the math words in English. This also revealed that watching my instructional video about common math words did help him retain the math terms in English. Unfortunately, I did not formally assess how Cinderella could sign and define in ASL all the math words if I asked him to do during the pre- and post-assessments. However, I did observe that Cinderella and the other three students understood me when I signed in ASL and signed the basic operations during class. For instance, when I asked Venom to explain how he got his answer to a warm-up problem involving addition and subtraction, he signed, "First, I

subtracted 2 from 8 and got 6. Then I added 4 got 10.” Therefore, due to time constraints, this goal was partially met, confirmed by my observation notes and assessments.

In summary of my curriculum evaluation, three out of the four goals were partially met. If I had more time and more students to implement this curriculum, I would have been able to collect more valid and concrete data to better determine the effectiveness of my curriculum. With more time, I could implemented Unit 3 lessons and be able to evaluate and meet the third curriculum goal that focused on the skill of thinking aloud. Also, if I had more time, I would have implemented the post-assessment to all four students, so that I could compare each student’s pre- and post-assessments and check for signs of improvement. Consequently, with more time and students, it was plausible to say that my curriculum would be successful.

X. CONCLUSION

To wrap up my thesis, I wanted to first express that the whole process of writing and implementing my curriculum was a rich experience. I felt grateful to be given this priceless opportunity to field-test my curriculum and gained authentic experience of applying what I learned during our courses at the University of California, San Diego.

Based on the data collected, three out of the four curriculum goals were partially met, from which I could assert that with more time, my curriculum could be effective. I would like to add that, despite of the struggles and challenges I had with teaching the four students, I felt joy when my students showed an excitement as they watched me model making a mind map. If only I had more time and more classrooms to implement, I would modify my curriculum to better fit my students' learning pace and background knowledge.

The process of writing the curriculum was an interesting experience. It brought me to become more confident in my ability as a teacher to develop and write well-organized lesson plans. It also brought me to consider and ensure that every student's need was met. Writing this curriculum was an experience worth having as part of my development as a bilingual teacher.

I had to say that this entire experience from writing to implementing the curriculum was definitely worthwhile and memorable for me because it made me grow so much as a Deaf teacher. With the desire to make better of myself, I accepted my mistakes wholly and took my feedback seriously from my cooperating teachers and my program professors. I would never ever stop challenging myself to become better and stay innovative!

Reflecting back my past two years, my journey to becoming an ASL-English teacher was a long, bumpy ride. For every up and down in my two years of teacher training, I embraced them and learned through making mistakes and enduring all kinds of struggles. I saw myself developing into a Deaf teacher after reading class materials and papers, student teaching at three different placements, learning teaching methodologies and theories, and typing my thesis. As of right now, I am truly looking forward to what the future holds in store for me in my life as an ASL-English bilingual teacher!

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In my past teaching experience, my students rarely take notes in class, especially during classroom discussions. They still need to work on taking good notes through more note-taking mini-lessons and hands-on practice.

APPENDIX A: Curriculum Materials

Curriculum Table of Contents

Note to the Teacher.....	86
Lesson Plan Format.....	88
How to Use the Mind Mapping Method.....	89
How to Use the Outline Method.....	90
How to Use the Cornell Method.....	91
Unit 1: Learning to Take Notes.....	92
• Lesson 1.1: What is note-taking?.....	93
• Lesson 1.2: Taking notes using note-taking strategies.....	97
○ Mini Lesson A: Make a mind map	
○ Mini Lesson B: Make an outline note	
○ Mini Lesson C: Make a Cornell note	
• Lesson 1.3: Making a student-generated rubric for taking notes.....	102
Unit 2: Learning to Watch Instructional Videos.....	104
• Lesson 2.1: What is an instructional video?.....	105
• Lesson 2.2: Taking notes while watching videos.....	108
○ Mini Lesson A: Using the mind mapping method	
○ Mini Lesson B: Using the outline method	
○ Mini Lesson C: Using the Cornell method	
Unit 3: Learning to Think Aloud.....	112
• Lesson 3.1: What is thinking aloud?.....	113
• Lesson 3.2: Thinking aloud while solving math problems.....	117
○ Mini Lesson: Thinking Aloud Pair Problem Solving Method	

Note to the Teacher

I want to first thank you for your interest in implementing this curriculum in your classroom! I am going to make this curriculum as clear and simple as possible for you to follow through as you teach it to your students. There are some things that I would like you to consider before using this curriculum.

First of all, this curriculum does not teach you how to flip your classroom (that is, recording all your lectures into videos for your students to watch outside the classroom and planning student activities or projects to do in class). This curriculum is designed to teach your students the skills that I believe they need to develop in order to thrive better in a flipped classroom. If you want to flip your classroom, then there are unlimited resources out there in print or online that you can find to learn more about flipping your classroom. After deciding to flip your classroom, you can use this curriculum as soon as you flip your classroom so that your students will learn how to take notes while watching your videos anywhere outside your classroom and how to think aloud while working with peers inside your classroom.

Secondly, you will need to be familiar with recording yourself signing in a video and editing it (unless you plan to use existing videos made by other educators). For my curriculum implementation, I recorded myself using the camera on my Apple AirBook and edited my videos using Zaption.com, a free online video editing website. Keep in mind that technology changes, improves, or gets outdated really quickly. Maybe by the time you are reading this, there could be a much better video-editing website than Zaption.com available to use! Therefore, it is up

to you HOW you will make your videos to use in this curriculum as long as you are comfortable in making and editing videos.

Thirdly, my lesson plans in this curriculum may not always work well for you and your students. I taught to a group of 7th Grade students for my curriculum implementation, and thus, I used the California Common Core State Standards for 7th Grade in both Math and Language Arts in the lesson plans. Also, the time length mentioned in each lesson plan was a very general estimate, based on my personal judgment. I did not anticipate how long it would take the students to grasp a concept. It is possible a lesson could take twice as much time as stated in its lesson plan. Therefore, how this curriculum should be tailored depends on you and your students. Please do make modifications in my lesson plans to make them more applicable for your students!

Lastly, I want you to know this curriculum can be modified to work in a different content of area other than math. For my curriculum implementation, I taught math, and so you will see that I used the California Common Core State Standards for mathematics in some of the lesson plans in this curriculum. But if you are teaching Science, for instance, you can replace the Math standards with appropriate Science standards and modify the activities that are practical to use in your Science classroom.

Finally, I hope you will enjoy implementing my curriculum and wish you all the best!

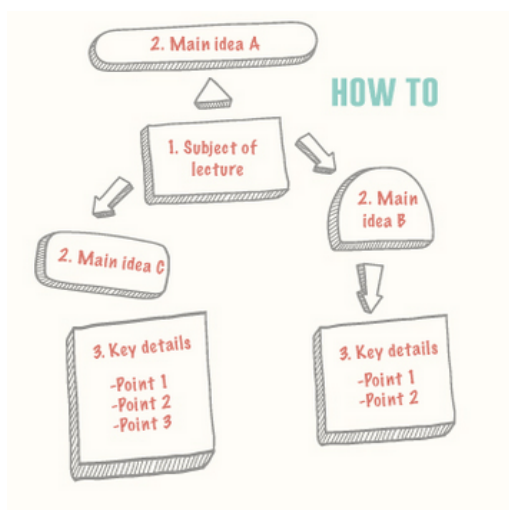
Lesson Plan Format

UNIT #: Unit Title LESSON #: Lesson Title	
Curriculum Goal(s)	<i>Which curriculum goal(s) is/are targeted in this lesson plan</i>
Standard(s)	CA CCSS English Language Arts: • CA CCSS Math: •
Learning Objective	<i>Given _____, students will _____, as measured by _____.</i>
Language Objective	ASL objective: <i>Given _____, students will _____, as measured by _____.</i> English objective: <i>Given _____, students will _____, as measured by _____.</i>
Formative Assessment Tasks	<i>What the teacher should do to check for students' understanding during instruction</i>
Summative Assessment Tasks	<i>What the teacher should do to check for students' understanding at the end of instruction</i>
Before Class	Preparation needed before class: For the teacher: ✓ Materials needed in class: •
During Class	<p>LAUNCH (5-10 mins) <i>How will the teacher launch this problem? What prior knowledge do the students need?</i></p> <p>EXPLORE (15-45 mins) <i>How will the teacher organize the students to explore this problem (individuals, groups, pairs)? What materials will students need to encourage diverse thinking and problem-solving? What are different strategies the teacher anticipate them using? What kinds of questions can the teacher ask?</i></p> <p>SUMMARIZE (15-25 mins) <i>How can the teacher orchestrate the discussion so the students summarize the thinking in the problem? What mathematics and processes need to be drawn out and emphasized?</i></p>
After Class	<i>What the teacher has to do after class:</i>

HOW TO USE THE MIND MAPPING METHOD

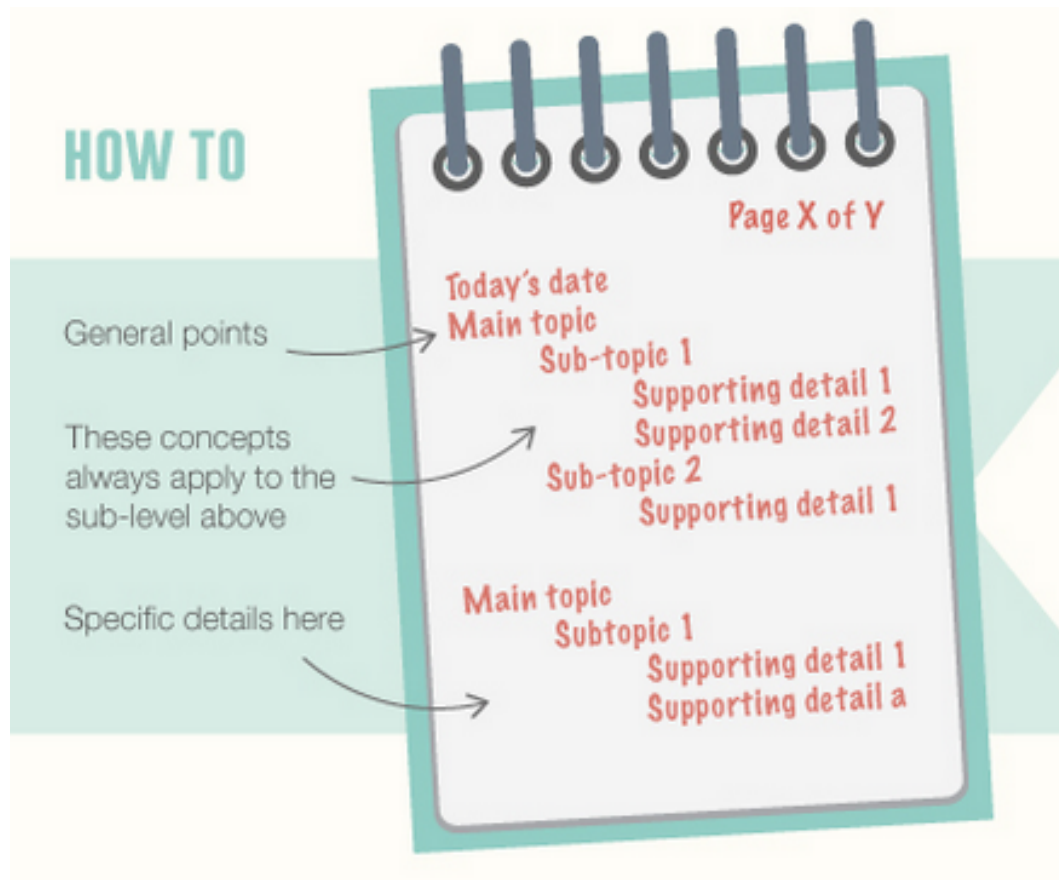
Tony Buzan's 7 steps in making a mind map:

1. **Start in the CENTRE of a blank page turned sideways.** Why? *Because starting in the centre gives your Brain freedom to spread out in all directions and to express itself more freely and naturally.*
2. **Use an IMAGE or PICTURE for your central idea.** Why? *Because an image is worth a thousand words and helps you use your Imagination. A central image is more interesting, keeps you focused, helps you concentrate, and gives your Brain more of a buzz!*
3. **Use COLOURS throughout.** Why? *Because colours are as exciting to your Brain as are images. Colour adds extra vibrancy and life to your Mind Map, adds tremendous energy to your Creative Thinking, and is fun!*
4. **CONNECT your MAIN BRANCHES to the central image and connect your second- and third-level branches to the first and second levels, etc.** Why? *Because your Brain works by association. It likes to link two (or three, or four) things together. If you connect the branches, you will understand and remember a lot more easily.*
5. **Make your branches CURVED rather than straight-lined.** Why? *Because having nothing but straight lines is boring to your Brain.*
6. **Use ONE KEY WORD PER LINE.** Why? *Because single key words give your Mind Map more power and flexibility.*
7. **Use IMAGES throughout.** Why? *Because each image, like the central image, is also worth a thousand words. So if you have only 10 images in your Mind Map, it's already the equal of 10,000 words of notes!*



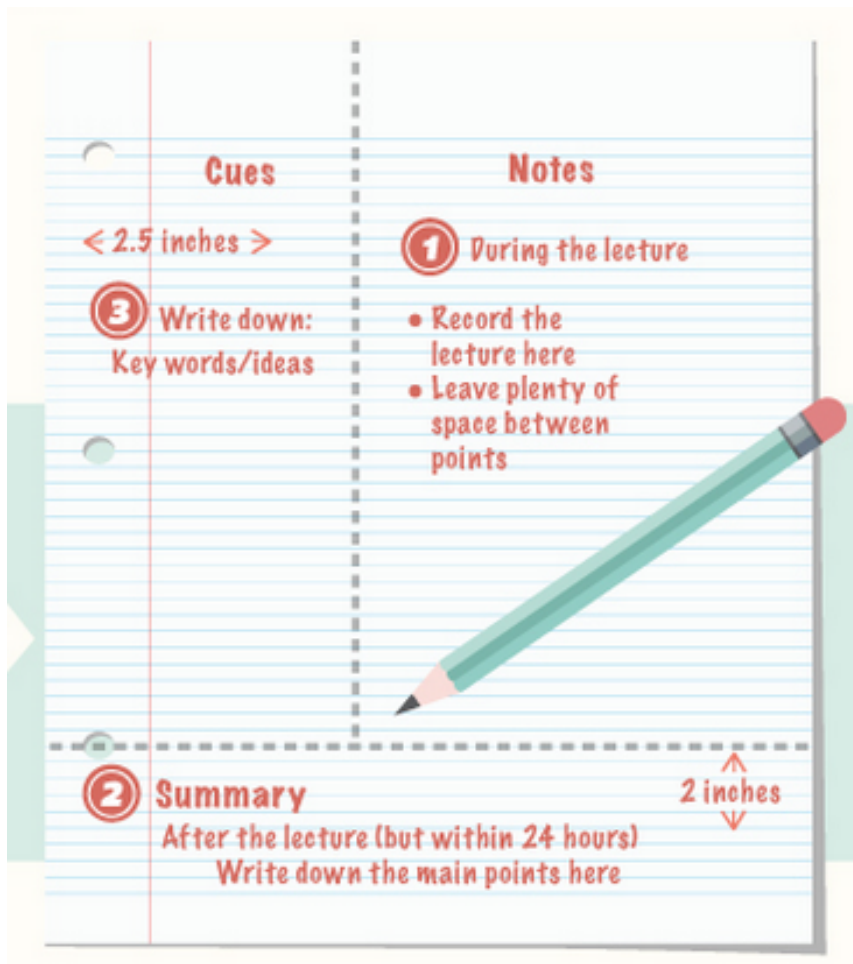
This figure is taken from the “The Ultimate Guide to Note Taking in Class” infographic on the Westminster Bridge Student Association (WBSA) website (<http://wbsa.co.uk/the-ultimate-guide-to-note-taking-in-class-infographic/>).

HOW TO USE THE OUTLINE METHOD



This figure is taken from the "The Ultimate Guide to Note Taking in Class" infographic on the Westminster Bridge Student Association (WBSA) website (<http://wbsa.co.uk/the-ultimate-guide-to-note-taking-in-class-infographic/>).

HOW TO USE THE CORNELL METHOD



This figure is taken from the "The Ultimate Guide to Note Taking in Class" infographic on the Westminster Bridge Student Association (WBSA) website (<http://wbsa.co.uk/the-ultimate-guide-to-note-taking-in-class-infographic/>).

UNIT 1: Learning to Take Notes

Unit Description: The goal of this unit is to introduce your students the importance of taking notes and how to take notes effectively. While there are many great note-taking strategies available to use, this curriculum teaches your students three, popular note-taking strategies. They are the mind mapping method, the outline method, the Cornell method. Your students will learn about each of them and how to utilize it appropriately in this unit. Your students will also work together to generate a rubric used to evaluate their notes.

UNIT 1: Learning to Take Notes LESSON 1.1: What is note-taking?	
Curriculum Goal(s)	To provide students note-taking strategies to improve their note-taking skills
Standard(s)	<p>CA CCSS English Language Arts, Speaking and Listening Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.SL.1: Engage effectively in a range of collaborative discussion (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly. • 7.SL.2: Analyze the purpose of information presented in diverse media and formats (e.g. visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.
Learning Objective	Given the teacher's materials, students will compare and contrast the differences and similarities of the three note-taking strategies (Cornell notes, outline notes, and mind maps), as measured by teacher observations.
Language Objective	<p>ASL: Given Quickwrites, students will discuss with their classmates in ASL what they have thought about the word "note-taking," as measured by teacher observations.</p> <p>English: Given the teacher's prompt, students will write a Quickwrite (a minute paper) about what they think of the word "note-taking," as measured by student artifacts.</p>
Formative Assessment Tasks	<p>Students will write a Quickwrite about what they think of the word "Note-taking." They will share their Quickwrites with their groups of classmates and with the class. Students will compare and contrast different examples of notes and discuss with their classmates their reasons. The teacher will observe their conversations and ask students questions to check in their understanding. Such questions are, but not limited to:</p> <p>During the Explore part of the lesson, the teacher will ask students questions to check in their understanding. Such questions are, but not limited to:</p> <ul style="list-style-type: none"> • What do you notice about _____? • Can you tell me why you think _____? • Why do you think _____? • Which example do you like the most and why? • Which strategy would you prefer to use to take your notes? • Which one looks the easiest or the hardest to read? <p>They will have to respond and explain their thinking in ASL, and the teacher will observe.</p>
Summative Assessment Tasks	At the end of this lesson, students will take turns taping or stapling an example of a note on a large-sized mind map on the wall that has three main branches. They are to work together

with the class in sorting examples into three groups. The other students will agree or disagree by holding a thumb-up or thumb-down. Then they have to list down some characteristics of each sorted group.

Before Class

Preparation needed before class:

- ✓ Search and print about 5-10 examples of each note-taking strategy. If not, make them up.
 - Some examples could be messy, unclear, or hard to read. Some examples could be clear, colorful, and easy to read.
- ✓ Make multiples copies of each example.
- ✓ For each set of copies, mix them up and put them in an envelope.
- ✓ Prepare a large-sized mind map for students to tape/staple the examples together as a class after the sorting activity.

Materials needed in class:

- ✓ About 5-10 examples for each note-taking strategy
- ✓ Short videos clips of cave painting, feather pen writing, Chinese calligraphy, Egyptian hieroglyphs, and any other kind of writing
- ✓ Pen and papers
- ✓ Tape or stapler
- ✓ Whiteboard or blackboard

During Class

LAUNCH (5-10 mins)

1. Tell the class that you are going to introduce something that does not have to have anything to do with math. Tell them that you are going to show some videos and ask them to watch and think about how the videos are related.
2. Play the short videos of various types of writing from around the world and from thousands of years ago. Such videos you could show are cave painting, feather pen writing, Chinese calligraphy, Egyptian hieroglyphs, and so on. While playing them, throw in questions such as:
 - a. What do you think the videos are showing?
 - b. Do you see anything in common about those videos?
 - c. What was this person in the video doing?

EXPLORE (15-45 mins)

1. After playing the video, write "Note-Taking" on the board and draw a circle around it.
2. Ask students to take out a blank paper and do a Quickwrite (writing for a minute or two) on what comes to their mind when they see the word on the board. You may want to give them questions to get them started on thinking, such as:

- a. What do you think this word mean? Think about what you just watched previously.
 - b. What does it look like?
 - c. How is it done?
 - d. Is it important or useful? Why or why not?
3. After they are done, ask them to do a Think-Pair-Share.
 - a. The Think-Pair-Share method is when one student thinks about a thought silently, then shares the thought with a partner, and finally shares the information to the whole class.
 - b. As they share their responses, write them down around the “Note-taking” circle on the whiteboard (it should look like a mind map).
 4. Ask the class to take a look at the mind map. Point at some branches that come close to the general definition of “note-taking.”
 - a. Note-taking is the process of writing down important information from a text, a lecture, or any type of source, to review and remember the information later.
 5. Tell the class we are going to do a sorting activity.
 6. Hand an envelope of examples of notes to each group of 2 or 3 students.
 7. Ask them to sort the examples into three piles based on the similarities that they see among the examples. For example, all examples that have circles and connecting lines (mind maps) should go in one pile.
 - a. Make sure to monitor students’ activity by walking around the room and asking questions to check in for understanding/thoughts.

SUMMARIZE (15-25 mins)

1. Show the class the empty large-sized mind map with three main branches on the wall. Have each group take turn taping or stapling one example to the correct branch. Pause at each example to check for everyone’s agreement (if someone disagrees, ask to explain why). Continue until all examples are taped to the mind map.
 - a. If someone disagrees, ask to explain his/her reasons.
2. Discuss on what is different and what is similar about each pile. Write down students’ responses in the mind map.
3. Finally, show the class the name of the note-taking strategy for each branch and write the name in a large font on the mind map. Explain to the class about each strategy.

- a. Cornell Method
- b. Outline Method
- c. Mind Mapping Method

After Class ✓ Collect and save your students' Quickwrite papers. Take pictures of them to keep digital copies.

UNIT 1: Learning to Take Notes LESSON 1.2: Taking notes using note-taking strategies (including Mini Lesson A, B, and C)	
Curriculum Goal(s)	To provide students note-taking strategies to improve their note-taking skills
Standard(s)	<p>CA CCSS English Language Arts, Speaking and Listening Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.SL.2: Analyze the purpose of information presented in diverse media and formats (e.g. visually, quantitatively, orally) and evaluate the motives (e.g. social, commercial, political) behind its presentation. <p>CA CCSS English Language Arts, Writing Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.W.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
Learning Objective	Give the three note-taking strategies, students will exercise making notes for each of the three strategies, as measured by student artifacts and teacher observations.
Language Objective	<p>ASL: Given the class activity, students will explain to their partners the notes that they wrote for each of the three note-taking strategies, as measured by teacher observations.</p> <p>English: Given the class activity, students will write notes using each of the three note-taking strategies in English, as measured by teacher observations.</p>
Formative Assessment Tasks	<p>Students will compare and contrast different examples of notes and discuss with their classmates their reasons. The teacher will observe their conversations and ask students questions to check in their understanding. Such questions are, but not limited to:</p> <ul style="list-style-type: none"> • What do you notice about _____? • Can you tell me why you think _____? • Why do you think _____? • Which method would you prefer to use? • Can you explain to me what ___(strategy name)___ is and how to use it? <p>The students will respond and explain their thinking in ASL, and the teacher will observe.</p>
Summative Assessment Tasks	<p>Students will write a reflection about what they have learned in this lesson, including responses to those, but not all questions below:</p> <ol style="list-style-type: none"> 1. Which note-taking strategy do you like and why? 2. Which note-taking strategy do you don't like and why? 3. Did today's lesson motivate you to take notes in the future?
Before Class	<p>Preparation needed before class:</p> <ul style="list-style-type: none"> ✓ Create a PowerPoint slideshow or show a template that shows the steps (in a clear and simple manner) in making the following:

- A mind map
 - A note in the outline format
 - A note in the Cornell format
- ✓ Prepare an example for each strategy (but you will write them during class to model to your students).

Materials needed in class:

- Papers and pen
- PowerPoint slideshows or diagrams

During Class

LAUNCH (5-10 mins)

1. Review with the class the concept of note-taking.
 - a. You could start off by saying, “Can anyone explain what note-taking is and why is it important to you?”
2. Tell the class that we are going to learn how to use each of the three strategies – mind mapping method, outline method, and Cornell method.

EXPLORE (15-45 mins)

3. Teach the three mini lessons as seen below. It is suggested to give students a short break in between the mini lessons to allow them to move around and refresh their focus in class.

Mini Lesson A: Make a Mind Map

4. Present the slideshow on how to make a mind map.
5. Tell the class, “Now you know the steps in making a mind map. I am going to show you an example. Let’s say I want to make a mind map to tell some things about myself.”
6. Model to the class by actually drawing out a mind map about yourself. Think aloud everything you are doing (saying out loud what and why you are doing what you are doing).
 - a. You may have the students sit around you to watch you draw on a large poster chart, or project your modeling using a digital overhead projector and they watch the white screen.
 - b. An example of a mind map you could draw is a drawing of yourself as the center of your mind map and makes three branches from it. The three branches could be “Family,” “Hobbies,” and “Favorite food.” Keep expanding your mind map until you feel your students are getting the big idea.
7. Have each student get a piece of paper and start making a mind map similar to yours.
8. When they are finished, do a Gallery Walk.
 - a. A Gallery Walk is having students walk around the classroom to look at other students’ work.

9. Wrap up by having them share their work and thoughts about this strategy.

Mini Lesson B: Make a Outline Note

10. Display the Outline Method template to the class.
11. Explain that to show a note is subordinate to the note above it, put a tab at the beginning of the line.
12. Say to the class, "Let's imagine that I am going on a camping trip and I need to make a note about what things I need to bring."
13. Model to the class by actually writing an outline note. Think aloud everything you are doing (saying out loud what and why you are doing what you are doing).
 - a. You may have the students sit around you to watch you draw on a large poster chart, or project your modeling using a digital overhead projector and they watch the white screen.
 - b. An example of a outline note you could write is:
 - i. Things I need to bring:
 1. Sleeping bag
 2. Tent
 3. Hiking shoes
 4. Hat
 5. Jacket
 - ii. Food I need to pack:
 1. Water
 2. Bread
 3. Peanut butter
 4. nuts
14. Have students work in pairs. Have them brainstorm and make an outline note together, but every student has to write their own copy.
 - a. Tell them that they can imagine going on a trip to anywhere they wish to go.
15. Have each pair of students show and explain their written notes to each other.
16. Wrap up by having them share their work and thoughts about this strategy.

Mini Lesson C: Make a Cornell Note

17. Display the Cornell Method template to the class.
18. Explain that the top row is where you write the title and date. The left 2" column is where you put the key words, main ideas, questions, names, and so on. The right column is where you write the notes, formulas, diagrams, descriptions, definitions, and so on. The bottom row is where you write a summary of the overall note on the page.

19. Say to the class, “I am going to show you how I take notes using the Cornell format. Suppose that I am a student in a math classroom and my teacher is teaching about the four basic operations – addition, subtraction, multiplication, and division.”
20. Model to the class by actually taking math notes using the Cornell Method. Think aloud everything you are doing (saying out loud what and why you are doing what you are doing).
 - a. You may have the students sit around you to watch you draw on a large poster chart, or project your modeling using a digital overhead projector and they watch the white screen.
 - b. An example of a Cornell note you could write is:
 - i. In the top row: Basic Operations and date
 - ii. In the left column: Addition, Subtraction, Multiplication, Division
 - iii. In the right column: different examples and ways to show addition, subtraction, multiplication, and division
 - iv. In the bottom row: The four basic operations that we use to calculate numbers are addition, subtraction, multiplication, and division.
21. Have students work with a partner, but each student has to write their own Cornell note.
 - a. They may write a Cornell note on the four operations like what you just modeled. Or they can choose to write notes about something else as long as they include four main ideas.
 - b. You may allow your students to choose a different theme for making their Cornell notes.
22. Have each pair of students show and explain their written notes to each other.
23. Wrap up by having them share their work and thoughts about this strategy.

SUMMARIZE (15-25 mins)

24. Divide students into groups of 2 or 3 and have them compare their notes. Encourage them to give comments and feedback on each other’s notes and to express their thoughts about those note-taking strategies. Some questions you may ask to elicit student discussion are:
 - a. What do you like about those note-taking strategies and why?
 - b. What do you not like about those note-taking strategies and why?

- c. How would taking notes using those strategies benefit you?
25. Have students write a short reflection about what they have learned today. Some questions to think about are:
- a. Which note-taking strategy do you like and why?
 - b. Which note-taking strategy do you don't like and why?
 - c. Did today's lesson motivate you to take notes in the future?

After Class

- ✓ Collect and save your students' notes.
- ✓ Collect students' reflections and keep them for evidence of students' learning progress.

UNIT 1: Learning to Take Notes	
LESSON 1.3: Making a student-generated rubric for taking notes	
Curriculum Goal(s)	To provide students note-taking strategies to improve their note-taking skills
Standard(s)	<p>CA CCSS English Language Arts, Speaking and Listening Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.SL.1: Engage effectively in a range of collaborative discussion (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
Learning Objective	Given work samples, students will generate a rubric that assesses the organization and clarity of a note, as measured by teacher observations.
Language Objective	<p>ASL: Given work samples, students will discuss with their classmates their reasons for how they categorized the work samples, as measured by teacher observations.</p> <p>English: Given class discussion, students will create a draft of a rubric, as measured by teacher observations.</p>
Formative Assessment Tasks	<p>Students will categorize the work samples and demonstrate their reasons of why they categorize them in a way. During the Explore part of the lesson, the teacher will ask students questions to check in their understanding. Such questions are, but not limited to:</p> <ul style="list-style-type: none"> • What is a rubric? • What do you notice about _____? • Can you tell me why you think _____? • Why do you think _____? <p>They will respond and explain their thinking in ASL, and the teacher will observe.</p>
Summative Assessment Tasks	At the end of the lesson, students will finish making a final draft of a rubric and then write a short reflection on what they learned today and how they felt about the process of generating a rubric together with the class.
Before Class	<p>Preparation needed before class:</p> <ul style="list-style-type: none"> ✓ Generate work samples using the three note-taking strategies (the Cornell method, the mind mapping method, and the outline method) ✓ Make multiple copies of the work samples for each group <p>Materials needed in class:</p> <ul style="list-style-type: none"> ○ Multiple copies of work samples ○ Poster charts and markers
During Class	<p>LAUNCH (5-10 mins)</p> <ol style="list-style-type: none"> 1. Lay out different work samples in different places around the classroom. Those work samples represent different performance levels.

2. Have students walk around the classroom and examine every one of them.
3. Call them to gather around in a circle and ask them to share what they noticed about those work samples.
4. Divide them into groups of 2 or 3 and hand each group a same set of work samples.
5. Ask them to categorize them. Keep this open-ended since students may have different perspectives on how they could categorize the work samples.
6. Ask students to share with the class how they categorized the work samples and why they did it their way. Most groups should notice by now that the most reasonable category is by performance levels.
7. After sharing, ask students what they think the most reasonable category. Ask them to categorize again by performance levels. Then ask them to write down the similarities within each sub-category.

EXPLORE (15-45 mins)

8. Discuss with students what they knew already about rubrics. Tell them that what they did earlier in this lesson is how rubrics are created. Tell them that they are going to design a rubric for assessing their written notes in the future.
9. Discuss criteria for a quality product. Ask students to work altogether to make a list of criteria and write on a poster chart.
10. Have them draft a rubric. Make an additional draft if some students are in disagreement and want to make a different version.
11. Then have students practice evaluating a couple of work samples using the drafted rubric. Also ask them to write down how each work samples can be improved below the rubric.

SUMMARIZE (15-25 mins)

12. Discuss and ask students to come to an agreement on the final draft of the rubric, which will be used to evaluate their notes in the future.
13. Have students write a short reflection about what they have learned today and how they felt about the process of generating a rubric together with the class.

After Class

- ✓ Collect and save your students' poster charts and drafted rubrics. Take pictures of them to keep digital copies.
- ✓ Collect students' reflections and keep them for evidence of students' learning progress.

UNIT 2: Learning to Watch Instructional Videos

Unit Description: The goal of this unit is to train your students to watch instructional videos with good active listening skills. Since in a flipped classroom, your students will be required to watch instructional videos to learn lecture materials, they will need to learn how to actively listen with their eyes and take notes. They will learn to take advantage of the power of pausing and adjusting the playing speed of a video to better fit their learning pace. This unit will provide your students activities that help develop their active listening skills and take notes while watching videos.

UNIT 2: Learning to Watch Instructional Videos LESSON 2.1: What is an instructional video?	
Curriculum Goal(s)	To improve students' ability to watch instructional videos with active listening skills
Standard(s)	<p>CA CCSS English Language Arts, Speaking and Listening Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.SL.2: Analyze the purpose of information presented in diverse media and formats (e.g. visually, quantitatively, orally) and evaluate the motives (e.g. social, commercial, political) behind its presentation.
Learning Objective	Given Sal Khan's TED talk "Let's use video to reinvent education," students will outline the pros and cons of watching instructional videos, as measured by teacher observations.
Language Objective	<p>ASL: Given class discussion, students will discuss with their classmates about anything relate to the word "video," as measured by teacher observations.</p> <p>English: Given class discussion, students will illustrate a mind map with the word "video" as the center, as measured by teacher observations.</p>
Formative Assessment Tasks	<p>In small groups, students will brainstorm what they know about the word "video" and create a mind map on a poster chart. They will discuss with their groups the pros and cons of watching instructional videos and the teacher will observe their conversations. The teacher will also ask students questions to check in their understanding. Such questions are, but not limited to:</p> <ul style="list-style-type: none"> • What is an instructional video? • What do you think about learning a topic from video? • What do you notice about _____? • Can you tell me why you think _____? • Why do you think _____? • Do you agree or disagree about _____? <p>Also, ask students to show you their written notes that they took prior to coming to class to check how they did their notes.</p>
Summative Assessment Tasks	<p>Students will write a short reflection about what they learned today and their opinions about instructional videos, including responses to those, but not all questions below:</p> <ol style="list-style-type: none"> 1. How do you like watching instructional videos? 2. Would you watch them? Why or why not? 3. Would you learn better this way? Why or why not? 4. What are some things you would want to learn through instructional videos?
Before Class	<p>Preparation needed before class:</p> <ul style="list-style-type: none"> ✓ Make an interaction video with Sal Khan's TED talk "Let's use video to reinvent education" using Zaption.com (or any online website where you can create and customize interactive

video lessons). Insert questions for students to responses at various points throughout the video.

Materials needed in class:

- Poster charts
- Markers
- Sal Khan’s TED talk “Let’s use video to reinvent education” interactive video

During Class

LAUNCH (5-10 mins)

1. Write the word, “video,” on the board. Ask students to think about what this word is.
2. Put students in groups of 2 or 3. For each group, they are to draw a mind map with the word “video” in the center on a poster chart.
3. As they work on their mind map, circulate the room and ask questions such as:
 - a. What do you do with videos?
 - b. What do you watch?
 - c. Where do you watch them?
 - d. What are all possible kinds of videos?
4. After students finish making their mind maps, have each group post their poster chart on the wall around the classroom. Have them do a Gallery Walk.
 - a. A Gallery Walk is having students walk around the classroom to look at other students’ work.
5. After the Gallery Walk, ask students to do a Think-Pair-Share about what have caught their eyes the most and what are common among all mind maps about videos.
 - a. The Think-Pair-Share method is when one student thinks about a thought silently, then shares the thought with a partner, and finally shares the information to the whole class.
6. Now, write the words “instructional videos” on the board and ask students what they think it is. Let them know that we are going to learn what instructional videos are and how to watch them in this unit.

EXPLORE (15-45 mins)

7. Play your interactive video Sal Khan’s TED talk “Let’s use video to reinvent education.”
 - a. Discuss why Sal Khan encouraged using videos to learn. Do you agree or disagree? Why?
 - b. Do a brief poll at the end of the video asking whether they want to watch videos to learn or not.
8. Have students discuss and write down the pros and cons of watching instructional videos in small groups of 2 or 3.
9. Have them share and discuss what they have written

down with the class. As they share, write their responses in a T-chart on a poster chart outlining the pros and cons.

SUMMARIZE (15-25 mins)

10. Have students write a short reflection about what they have learned today and their opinion about instructional videos. Some questions to think about are:
 - a. How do you like watching instructional videos?
 - b. Would you watch them? Why or why not?
 - c. Would you learn better this way? Why or why not?
 - d. What are some things you want to learn through instructional videos?

After Class

- ✓ Collect and save your students' poster charts. Take pictures of the poster charts to keep digital copies.
- ✓ Collect students' reflections and keep them for evidence of students' learning progress.

UNIT 2: Learning to watch instructional videos LESSON 2.2: Taking notes while watching videos (including Mini Lesson A, B, and C)	
Curriculum Goal(s)	To improve students' ability to watch instructional videos with active listening skills
Standard(s)	<p>CA CCSS Math – Expressions and Equations, Grade 6</p> <ul style="list-style-type: none"> • 6.EE.1: Write and evaluate numerical expressions involving whole-number exponents. • 6.EE.2: Write, read, and evaluate expressions in which letters stand for numbers. <p>CA CCSS English Language Arts, Speaking and Listening Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.SL.2: Analyze the purpose of information presented in diverse media and formats (e.g. visually, quantitatively, orally) and evaluate the motives (e.g. social, commercial, political) behind its presentation. <p>CA CCSS English Language Arts, Writing Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.W.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
Learning Objective	Given teacher-made instructional videos, students will take notes using each of the three note-taking strategies, as measured by students' artifacts and teacher observations.
Language Objective	<p>ASL: Given the class activity, students will compare their written notes with their classmates in ASL and give comments/feedback on each other's notes, as measured by teacher observations.</p> <p>English: Given instructional videos, students will write notes in English using each of the three note-taking strategies, as measured by students' artifacts and teacher observations.</p>
Formative Assessment Tasks	<p>During the Explore part of the lesson, the teacher will circulate the room to monitor students' activity. The teacher will ask students questions to check in their understanding. Such questions are, but not limited to:</p> <ul style="list-style-type: none"> • What do you notice about _____? • Can you tell me why you think _____? • Why do you think _____? • How do you feel when _____? • What do you like about _____ and why? <p>They will respond and explain their thinking in ASL, and the teacher will observe.</p>
Summative Assessment Tasks	<p>Students will use the rubric they generated in Lesson 1.3 to evaluate their written notes. Students will write a short reflection about what they learned today, including responses to those questions below:</p> <ol style="list-style-type: none"> a. How do you feel when you watched instructional videos?

Was it interesting or boring?

- b. Which type of instructional videos do you like and why?
- c. Which type of instructional videos do you don't like and why?
- d. Would you prefer to learn from a teacher in class or to learn from an instructional video and why?

Before Class **Preparation needed before class:**

- ✓ Make 3 videos of yourself teaching a number of specific math topics (preferably something simple so your students can focus on practicing with using the note-taking strategies to take notes of what they are watching)
- ✓ Email the link of the videos to all your students before class.

Materials needed in class:

- 3 teacher-made videos
- Papers and pen
- laptops

During Class **LAUNCH (5-10 mins)**

1. Review with the class what they remember about instructional videos and Sal Khan's TED Talk "Let's use video to reinvent education." You could start off by saying, "Can anyone tell me what an instructional video is? How is it different from any other video?"
2. Tell the class that we are going to practice taking notes while watching short videos using each of the three note-taking strategies.

EXPLORE (15-45 mins)

3. Teach the three mini lessons as seen below. It is suggested to give students a short break in between the mini lessons to allow them to move around and refresh their focus in class.
4. To model to your students how to watch and do active listening, make sure the students are able to observe both the videos and the note that you are taking during the process. For instance, you could have the students sit closely around you at your desk and display the video on the overhead projector behind you.
5. Tell your students at the beginning of every mini lesson that you are going to be a student and model how to watch and take notes using a particular strategy. You want them to observe closely to what you say when you are thinking aloud during the process of watching and taking notes.
6. When you are modeling, make sure to show students WHEN and WHY to pause, rewind, and/or replay a video. Some examples of things you could say while modeling are:

- a. "Oh, I just missed what the teacher said a second ago. I am rewinding a few seconds back to pay attention closely to what she is saying."
- b. "I see the word 'operation' and I think it's an important word to know. I'm pausing the video so I can write it down on my mind map."
- c. "I'm pausing the video because I need to look down to my paper to write. I don't want to miss anything."
- d. "Now I'm done writing and I'm playing the video to continue."
- e. "I don't think I understand this part. I am rewinding to watch again."
- f. "I think this word/idea is important to record. I'm pausing the video now so I can write it down right away."

Mini Lesson A: Using the Mind Mapping Method

7. Begin the video you made to be use for this mini lesson.
8. Think aloud to show your students what you are thinking as you are watching and writing notes.
 - a. Make sure to model to them WHEN to pause, rewind, and replay.
 - b. See examples of what to say when modeling above.
9. When students seem to get the idea, have them get their own laptop and start writing notes using the mind map method.
10. When they are finished, have them pair up and compare each other's mind maps. Then have each student evaluate their work with the rubric that they generated in Lesson 1.3.
11. Wrap up and collect students' mind maps.

Mini Lesson B: Using the Outline Method

12. Begin the video you made to be use for this mini lesson.
13. Think aloud to show your students what you are thinking as you are watching and writing notes.
 - a. Make sure to model to them WHEN to pause, rewind, and replay.
 - b. See examples of what to say when modeling above.
14. When students seem to get the idea, have them get their own laptop and start writing notes using the Outline method.
15. When they are finished, have them pair up and compare each other's mind maps. Then have each student evaluate

their work with the rubric that they generated in Lesson 1.3.

16. Wrap up and collect students' outline notes.

Mini Lesson C: Using the Cornell Method

17. Begin the video you made to be use for this mini lesson.

18. Think aloud to show your students what you are thinking as you are watching and writing notes.

a. Make sure to model to them WHEN to pause, rewind, and replay.

b. See examples of what to say when modeling above.

19. When students seem to get the idea, have them get their own laptop and start writing notes using the Cornell method.

20. When they are finished, have them pair up and compare each other's mind maps. Then have each student evaluate their work with the rubric that they generated in Lesson 1.3.

21. Wrap up and collect students' Cornell notes.

SUMMARIZE (15-25 mins)

22. Divide students into groups of 2 or 3 and have them compare their notes. Encourage them to give comments and feedback on each other's notes and to express their thoughts about different instructional videos. Some questions you may use to elicit student discussion are:

a. What do you like or not like about instructional videos and why?

b. What are some things you wish that could improve your experience with watching instructional videos?

c. How would watching instructional videos benefit you?

23. Have students write a short reflection about what they have learned today. Some questions to think about are:

a. How do you feel when you watched instructional videos? Was it interesting or boring?

b. Which type of instructional videos do you like and why?

c. Which type of instructional videos do you don't like and why?

d. Would you prefer to learn from a teacher in class or to learn from an instructional video and why?

After Class

✓ Collect students' reflections and keep them for evidence of students' learning progress.

UNIT 3: Learning to Think Aloud

Unit Description: The goal of this unit is to have your students develop and improve their thinking-aloud skills. They will examine different types of think-alouds and learn to identify the types of think-alouds. They will also learn how to express their thinking in both ASL and English using thinking stems, such as “I notice...” and “I am figuring out...” In addition, they will briefly learn the Thinking Aloud Pair Problem Solving method (TAPPS) that will encourage students to utilize thinking stems while solving a math problem.

UNIT 3: Learning to Think Aloud LESSON 3.1: What is thinking aloud?	
Curriculum Goal(s)	<ul style="list-style-type: none"> - To increase students' metacognition in math problem solving through the use of think-aloud strategy - To encourage students to develop and utilize their math academic language in both ASL and English
Standard(s)	<p>CA CCSS Math – Expressions and Equations, Grade 6</p> <ul style="list-style-type: none"> • 6.EE.1: Write and evaluate numerical expressions involving whole-number exponents. • 6.EE.2: Write, read, and evaluate expressions in which letters stand for numbers. <p>CA CCSS English Language Arts, Speaking and Listening Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.SL.2: Analyze the purpose of information presented in diverse media and formats (e.g. visually, quantitatively, orally) and evaluate the motives (e.g. social, commercial, political) behind its presentation. <p>CA CCSS English Language Arts, Writing Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.W.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
Learning Objective	Given the teacher-made think-aloud video, students will examine different types of think-alouds and match them with correct definitions, as measured by student handouts and teacher observations.
Language Objective	<p>ASL: Given cutout strips of types of think-alouds and definitions, students will discuss in ASL with their classmates while working on the matching activity, as measured by teacher observations.</p> <p>English: Given cutout strips of types of think-alouds and definitions, students will read the words (types of think-alouds) and definitions, as measured by teacher observations.</p>
Formative Assessment Tasks	<p>Students will review the word “think-aloud” in pairs. They will work with their small groups to match a type of think-aloud with its correct definition. While they are discussing in ASL, the teacher will observe their conversations for any misunderstanding. Also during class, the teacher will ask students questions to check in their understanding. Such questions are, but not limited to:</p> <ul style="list-style-type: none"> • What do you notice about _____? • Can you tell me why you think _____? • What did I say when _____? • What does this _____(type of think-aloud)_____ mean? • Tell me one example of how I started a sentence when I was talking to myself. <p>Students will respond and explain in ASL, and the teacher will observe.</p>

Summative Assessment Tasks	<p>Students will write a reflection about what they have learned in this lesson, including responses to those questions below:</p> <ol style="list-style-type: none"> 1. What is thinking aloud? 2. Name one type of think-aloud and write its definition. 3. What is one confusing thing you have from this lesson? 4. Did you learn something new today? If yes, what is it? If not, why? 5. What do you think about the video today and how do you feel about it?
Before Class	<p>Preparation needed before class:</p> <ul style="list-style-type: none"> ✓ Record a video of yourself thinking aloud while solving a math problem (relevant to what your students already know). Make sure to demonstrate all types of think-alouds while solving a math problem in your video. Try to keep the video in between 2 to 5 minutes long. ✓ Create an observation sheet in which students will use to observe your video and tally how often they see you use the types of think-alouds given in the list. ✓ Type and cut out the types of think-alouds and the definitions. Make several copies and put them in separate envelopes (for group activities). ✓ Print an enlarged version of the matching activity. <p>Materials needed in class:</p> <ul style="list-style-type: none"> ○ Envelopes containing paper strips of types of think-alouds and the definitions ○ Enlarged print of the types of think-alouds and the definitions ○ “Thinking Aloud Observation Sheet” handouts ○ The teacher-made video showing the teacher thinking aloud
During Class	<p>LAUNCH (5-10 mins)</p> <ol style="list-style-type: none"> 1. Write “Think-aloud” on the whiteboard and draw a circle around it. 2. Have students pair up and brainstorm what they think the word “Think-aloud” may mean. Ask them to think about how it can be applied to problem solving. 3. While brainstorming, have students come up to the whiteboard and add a branch to the circle. <ol style="list-style-type: none"> a. This should start to look like a mind map on the whiteboard. 4. After brainstorming, observe the mind map and discuss with the class what they notice about the general idea of what the word “Think-aloud” is. 5. Tell the class that you are going to play a short clip of the video that you have created of yourself thinking aloud while solving problem.

6. Before playing the video, explain your expectations.
 - a. Pay attention to the video.
 - b. Watch closely to what I said in the video.
 - c. Notify them that you will ask some students questions to respond.
7. Play the short clip of the video.
8. Ask the class to share what they noticed in the video.
9. Have them look at the “Think Aloud” mind map on the whiteboard and ask them if their initial idea of a think-aloud has changed. Elicit their thinking and observations by asking these questions (feel free to add more questions):
 - a. Has their initial idea of thinking aloud changed? If yes, how so?
 - b. What did you notice about what I said in the video?
 - c. Can anyone define what a “think-aloud” is?
10. Explain to the class that the definition of “thinking aloud”
 - a. Thinking aloud: Saying or signing out loud what one is thinking right at the moment.
 - b. Thinking aloud helps us slow down and monitor our thinking process as we work on a math problem.
 - c. Thinking aloud helps us retrace our thinking process and identify our mistakes.

EXPLORE (15-45 mins)

11. Tell the class that there are types of think-alouds and we are going to do a matching activity.
12. Group 2 or 3 students. Hand each group an envelope containing the types of think-alouds and the definitions.
13. Instruct them that they are to examine the types and the definitions and do their best to match the type with the correct definition.
14. When they are finished, review with the class using the enlarged print of the matching activity sheet. Discuss about each type and its definition.
 - a. Check for agreement, and if someone disagrees, ask to explain why.
15. Tell the class that we are going to watch the full video.
16. Pass them out the “Thinking Aloud Observation Sheet” handouts.
 - a. Explain that they are to observe everything I say in the video and determine what type of think-aloud I am using. Tally every type I am using and write a few examples on their handout.
17. Play the video.
18. During the video, pause from time to time to allow the

students time to tally and write down the examples.

- a. Or you may have the class work together by asking the students for the examples and writing them down on the whiteboard with the type identified for each.
19. After the video ends, ask students to compare their observation sheets with a partner sitting next to them. Ask them to discuss on the following questions:
- a. Is your partner's observation similar to yours?
 - b. What is the biggest difference between yours and your partner's?
 - c. What do you notice about the video?
 - d. How do you feel about it?

SUMMARIZE (15-25 mins)

20. To wrap up this lesson, have students write a short reflection about what they have learned today. Some questions to think about are:
- a. What is thinking aloud?
 - b. Name one type of think-aloud and write its definition.
 - c. What is one confusing thing you have from this lesson?
 - d. Did you learn something new today? If yes, what is it? If not, why?
 - e. What do you think about the video today and how do you feel about it?

After Class

- ✓ Collect students' completed observation sheets.
- ✓ Collect students' reflections and keep them for evidence of students' learning progress.

UNIT 3: Learning to Think Aloud	
LESSON 3.2: Thinking aloud while solving math problems	
Curriculum Goal(s)	<ul style="list-style-type: none"> - To increase students' metacognition in math problem solving through the use of think-aloud strategy - To encourage students to develop and utilize their math academic language in both ASL and English
Standard(s)	<p>CA CCSS Math – Expressions and Equations, Grade 6</p> <ul style="list-style-type: none"> • 6.EE.1: Write and evaluate numerical expressions involving whole-number exponents. • 6.EE.2: Write, read, and evaluate expressions in which letters stand for numbers. <p>CA CCSS English Language Arts, Speaking and Listening Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.SL.2: Analyze the purpose of information presented in diverse media and formats (e.g. visually, quantitatively, orally) and evaluate the motives (e.g. social, commercial, political) behind its presentation. <p>CA CCSS English Language Arts, Writing Standards, Grade 7</p> <ul style="list-style-type: none"> • 7.W.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
Learning Objective	Given the teacher-made video, students will examine different thinking stems and utilize them while solving a math problem with a partner using the TAPPS method, as measured by student handouts and teacher observations.
Language Objective	<p>ASL: Given the TAPPS activity, students will think aloud in ASL using the thinking stems while solving a math problem, as measured by teacher observations.</p> <p>English: Given the teacher-made video, students will write down at least three thinking stems that they have observed in the video, as measured by teacher observations.</p>
Formative Assessment Tasks	<p>Students will watch the video of the teacher using thinking stems while working on a math problem. They will observe how to think aloud using thinking stems. In addition, they will work in pairs in solving a math problem using the TAPPS method. During class, the teacher will circulate the room and give feedback. The teacher will also ask students questions to check in their understanding. Such questions are, but not limited to:</p> <ul style="list-style-type: none"> • What do you notice about _____? • Can you tell me why you think _____? • What did I say when _____? • What is a thinking stem? • Give one example of a thinking stem. • If you get stuck, which thinking stems would be appropriate to use?

	<ul style="list-style-type: none"> I saw you signed _____(thinking stem)_____, what type of think-aloud would that be? <p>Students will respond and explain in ASL, and the teacher will observe.</p>
Summative Assessment Tasks	<p>Students will write a reflection about what they have learned in this lesson, including responses to those questions below:</p> <ol style="list-style-type: none"> 1. What is one interesting thing that you have learned today? 2. What is a thinking stem? 3. How do you feel about thinking aloud while solving a problem? 4. What did you about the TAPPS method? How do you like it?
Before Class	<p>Preparation needed before class:</p> <ul style="list-style-type: none"> ✓ Make a video of yourself thinking aloud while solving a short math problem. In the video, make sure to use as many different thinking stems as possible while you are thinking aloud. Try to keep the video in between 2 to 5 minutes long. ✓ Make another video of yourself working with a partner using the TAPPS method. Pick a simple math problem that is relevant to what your students have already learned. Try to keep the video in between 2 to 5 minutes long. <p>Materials needed in class:</p> <ul style="list-style-type: none"> ○ Whiteboard and markers ○ The teacher-made video showing the teacher using thinking stems ○ The teacher-made video showing the teacher using the TAPPS method ○ Papers and pen ○ “Thinking Stems Observation Sheet” handouts ○ handouts of two math problems that are similar to the math problem that you used in your TAPPS demonstration video.
During Class	<p>LAUNCH (5-10 mins)</p> <ol style="list-style-type: none"> 1. Review the word “think-aloud.” Do a Think-Pair-Share. <ol style="list-style-type: none"> a. The Think-Pair-Share method is when one student thinks about a thought silently, then shares the thought with a partner, and finally shares the information to the whole class. 2. Review all types of think-alouds that we did in the previous lesson. Pick a student randomly to name a type of think-aloud, explain its definition, and provide an example. <ol style="list-style-type: none"> a. Write down the types of think-alouds and the examples on the whiteboard when students state them. 3. After the quick review with the class, tell them that we are going to first observe different ways to think aloud a

sentence and will do an activity to practice thinking aloud.

EXPLORE (15-45 mins)

4. Explain that those examples on the whiteboard are sentence starters for thinking aloud. They are called “thinking stems.”
 - a. Thinking stems help us reflect on what we are thinking and envision a possible solution to the problem that we are trying to solve.
5. Pass out the “Thinking Stems Observation Sheet” handouts to students. Tell them that they may have seen most of the thinking stems and some may be new.
6. Sign each thinking stem in the list in ASL together with the class. Check to make sure everyone knows what each thinking stem looks like.
 - a. The thinking stems are listed below:
 - i. I’m thinking ...
 - ii. I’m wondering ...
 - iii. I’m noticing ...
 - iv. I’m picturing ...
 - v. I’m predicting ...
 - vi. I just learned ...
 - vii. I’m figuring out ...
 - viii. This is confusing because ...
 - ix. The question I have is ...
 - x. I want to know ...
 - xi. What I’m going to do next is ...
 - xii. I don’t understand ...
 - xiii. What would happen if ...
 - xiv. What information do I need ...
 - xv. Why does...
7. Tell students that you are going to play the video of you thinking aloud using those thinking stems. Have them observe closely to what I say in the video and tally down the thinking stem that I used. Pay attention when I begin a sentence and when I talk to myself.
8. Play the video. Students should be observing and marking tallies on their handouts as they watch the video.
 - a. You may pause the video to allow time for students to process what they have watched.
9. After the video ends, go through the list of thinking stems with the class asking how many tallies they have marked down for each.
10. Recap with the class how using thinking stems could help them go through the thinking process when solving a problem.
 - a. They help us slow down and monitor our thinking

- process as we work on a math problem.
- b. They help us retrace our thinking process and identify our mistakes.
 - c. They help you reflect on what we are thinking and envision a possible solution to the problem that we are trying to solve.
11. Tell the class that we are going to learn a thinking aloud method called Thinking Aloud Pair Problem Solving (TAPPS).

Mini Lesson: Thinking Aloud Pair Problem Solving Method

12. Write on the whiteboard the name of the method, "Thinking /aloud Pair Problem Solving (TAPPS)."
13. Inform the class that you are going to play the video of you using the TAPPS method with a partner to demonstrate how it works.
 - a. Tell them to observe closely because you will choose a student randomly after the video to explain what they have observed.
14. Play the video.
15. After the video, randomly choose at least one student to share what they have observed and thought about how the TAPPS method works.
16. Summarize and briefly explain the TAPPS method.
 - a. In every pair of students, one partner is the problem solver while the other partner is the listener. The problem solver reads the problem aloud and thinks aloud through everything to a solution, using thinking stems. The listener observes and follows all the problem solver's steps. He/she must understand the reasoning behind every step and ask questions if the problem solver's thinking process becomes unclear. However, the listener should not guide the problem solver to a solution or criticize a specific error.
17. Pass out the handouts containing two math problems that are similar to the math problem that you used in your TAPPS demonstration video.
18. Have students pair up and proceed to do the same as they have observed in the video. When one partner finishes the first math problem, switch roles and repeat with the second math problem.
 - a. While they are at it, circulate the room and provide feedback. Do model some examples to give them a better understanding of how to think aloud.

SUMMARIZE (15-25 mins)

19. To wrap up this lesson, have students write a short reflection about what they have learned in this lesson, including responses to those questions below:

- a. What is one interesting thing that you have learned today?
- b. What is a thinking stem?
- c. How do you feel about thinking aloud while solving a problem?
- d. What did you about the TAPPS method? How do you like it?

After Class

- ✓ Collect students' completed observation sheets.
- ✓ Collect students' reflections and keep them for evidence of students' learning progress.

APPENDIX B: Lesson Materials

Pre-Assessment Materials
Pre-Implementation Interview

Student Name: _____
Date of Interview: _____

PRE-IMPLEMENTATION INTERVIEW

1. What is your favourite cartoon character?
2. What do you like about math?
3. What do you not like about math?
4. Do you take notes when your teacher is teaching you? If yes, how often? If not, why not?
5. Do you have a computer at home?
6. Do you like to write?
7. Do you like to draw and/or color?

Pre-Assessment Materials
Pre-Assessment Problem Sheets

Name: _____

Draw a line to connect the words and symbols.

Addition •	• × •	• Divide
Multiplication •	• – •	• Subtract
Subtraction •	• ÷ •	• Add
Division •	• + •	• Multiply

Name: _____

Draw a line to connect the words and symbols.

Addition •	• × •	• Divide
Multiplication •	• – •	• Subtract
Subtraction •	• ÷ •	• Add
Division •	• + •	• Multiply

Name: _____

What is the word for the number or symbol in bold?

Fill in the blank (use each word only once).

parentheses	sum	number	quotient
difference	equal	product	exponent

$4 + 5 = \mathbf{7}$ _____

$3^{\mathbf{2}} + 1 = 10$ _____

$7 \times 2 = \mathbf{14}$ _____

$4 - 3 = \mathbf{1}$ _____

$10 \div 2 = \mathbf{5}$ _____

$(3 + 1) \times 2 = \mathbf{8}$ _____

Name: _____

What is the word for the number or symbol in bold?

Fill in the blank (use each word only once).

parentheses	sum	number	quotient
difference	equal	product	exponent

$4 + 5 = \mathbf{7}$ _____

$3^{\mathbf{2}} + 1 = 10$ _____

$7 \times 2 = \mathbf{14}$ _____

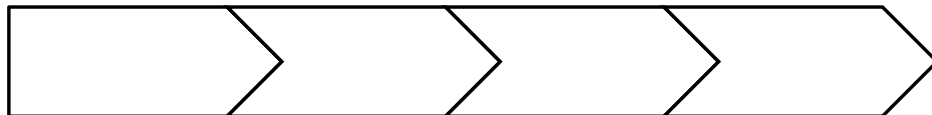
$4 - 3 = \mathbf{1}$ _____

$10 \div 2 = \mathbf{5}$ _____

$(3 + 1) \times 2 = \mathbf{8}$ _____

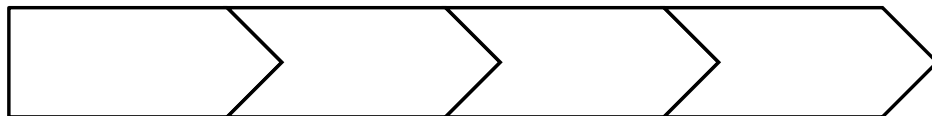
Name: _____

Cut and paste the operations in the correct order.



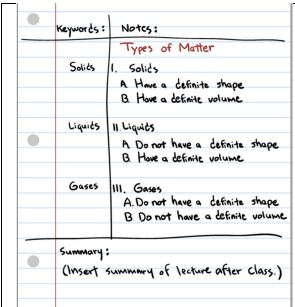
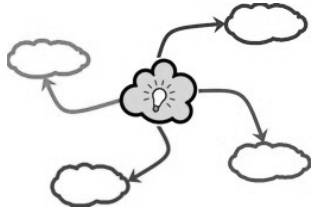
Name: _____

Cut and paste the operations in the correct order.



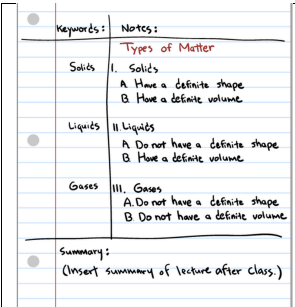
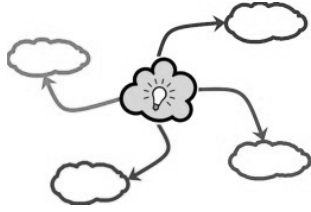
Name: _____

Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
		<p>I. MAIN IDEA</p> <p>A. _____</p> <p>1. _____</p> <p>2. _____</p> <p style="margin-left: 20px;">a. _____</p> <p style="margin-left: 20px;">b. _____</p>

Name: _____

Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
		<p>I. MAIN IDEA</p> <p>A. _____</p> <p>1. _____</p> <p>2. _____</p> <p style="margin-left: 20px;">a. _____</p> <p style="margin-left: 20px;">b. _____</p>

Name: _____

Solve each expression.

$3^2 =$	$2 \times 3 \div 2 =$	$3 + 5 - 2 =$
$2 \times (3 + 2) =$	$10 - 4 \times 2 =$	$6 \div 2 - 3 =$
$1 + 2 \times 3 =$	$2^2 + 1 =$	$2 \times 2 + 2 \times 2 =$

Name: _____

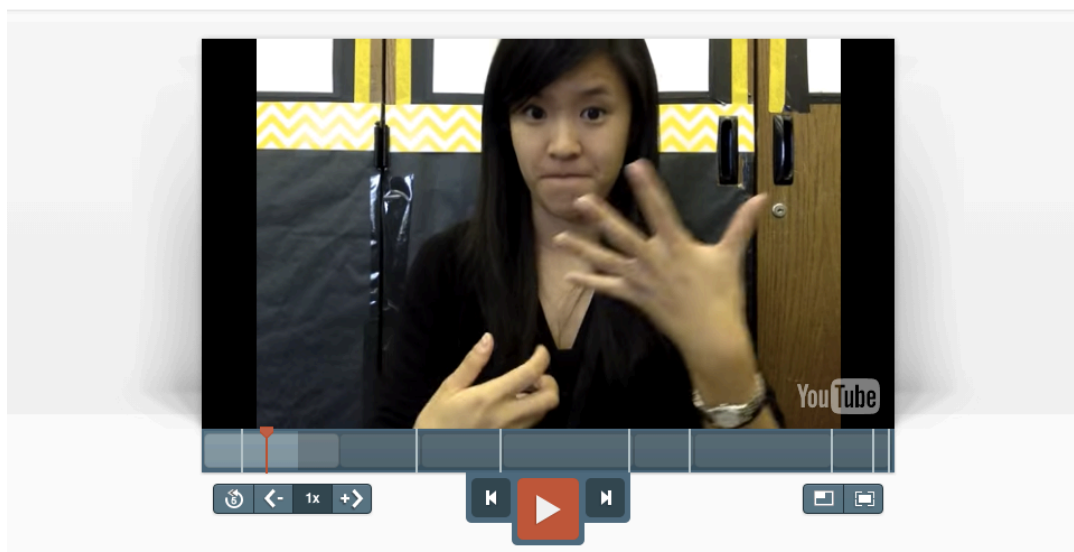
Solve each expression.

$3^2 =$	$2 \times 3 \div 2 =$	$3 + 5 - 2 =$
$2 \times (3 + 2) =$	$10 - 4 \times 2 =$	$6 \div 2 - 3 =$
$1 + 2 \times 3 =$	$2^2 + 1 =$	$2 \times 2 + 2 \times 2 =$

Pre-Assessment Materials
ASL Video for Pre-Assessment (on Zaption.com website)

Pre-Assessment

Author: Michelle Chung Published: April 19th, 2016 Length: 05:51



The link to the video is

<https://www.zaption.com/lessons/57167e25b3b5b4c3208830ec>.

Lesson Materials 1.1

Sorting Activity: Examples of Outline Notes

Coping Techniques

- Penning Leap
- Simplify
- London - keep busy - hands, feet
- Scared, unaccomplished
- Massage tool
- Tennis ball, ice
- Relaxing images/visualization
- Water/hot shower
- could put ball in tub - spray on back or sit on stool, try posture
- Essential oils
 - lavender, peppermint
 - could help after steam, contraction, push
- Comb or gripping tool - press comb times
- Gripping w/ paper
- Bandy straps
- baby room hydrated
- informed consent questions - if intent is medical is
- Is Baby OK? - is Mom OK?
- Can we have more time? or what if what?

#HOT MWR 12 2011

called computer-assisted journalism

Really interesting

Used data (old school)

Subjects

Excel

(Notes)

Geo-tagged images

Anything online - Digging

Asked RAND - hierarchy of these

gives you an overview of these

- They could not or wouldn't do it

- Data is necessary to report

- After David Collier 2, write in Berkeley Springs restaurant

- Started conclusion - respect!

- Followed it up by off status

- Don't jump to conclusions

Why use data?

- No more, according to

- When you assume that's why

- You become the authority

- Uncover the stories the subject

- don't even know

- Which is the story, after

- wanted to know

- what is the story - checked

- near (George/Lady hall)

- decided that they

- lots of people

- City didn't bother to look at

- Confirm your data that way

- Most hotels in Berkeley

- 3rd most hotels in Berkeley

- Across from hospital

- visitors, busy hospital

G. 8.49 Lecture 3 Sept. 15, 2010

Single vertex, cross pattern (without face & geometry)

= disk or paper

circle made of

= circular sequence of angles $\Theta_1, \Theta_2, \dots, \Theta_n$

- normally $\Theta_1, \Theta_2, \dots, \Theta_n = 360^\circ$

- allow other sizes, especially $< 360^\circ$ (corner case)

- in particular for induction

Flat filling = filling of 1D circle (boundary of disk)

= filling of 1D

Circle with line

(assuming convex case, at least one full)

→ can't reach all the way around circle

Differences from 1D (segment) flat filling:

- alternating MV can fail

- equilateral up all mountain-valley patterns possible

- missing up all valleys

- could have ... (C)(C) ... circularly

Body Language and Oral Presentations

Traditional Format

A. Movement & natural movement

1. Control distracting movements (pointing)
2. Develop natural style (stress points)
3. Move forward to stress points
4. Hold objects so audience can see them (never put them away)
5. Avoid excessive and uncontrolled movement.

B. Facial Expressions

1. Smile
2. Appear relaxed and friendly.

C. Gestures

1. Use natural gestures to emphasize your points
2. Integrate and coordinate gestures with text
3. Examples
 - a. number of fingers - number down
 - b. use of hand - use of hand
 - c. use of hand - use of hand
4. Use gestures to help pace yourself
5. Use gestures based on audience size.

D. Posture

1. Practice good posture
2. Don't pop up against wall or desk
3. Don't sit unless it's part of presentation

White Fang

- I. Jack London
 1. 1876 to 1916
 2. San Francisco
 3. Klondike gold rush
- II. Characters
 - A. White Fang
 1. one eye
 2. she wolf, kiche
 - B. Gods
 1. gray beaver
 2. beauty smith

Lesson Materials 1.1

Sorting Activity: Examples of Mind Maps

The image displays seven distinct mind maps and concept charts, each illustrating a different organizational structure for information. The 'FIVE SILENCES' map uses a hand as a central metaphor. The 'Concept Chart' for 'Body Language' is a hierarchical tree diagram. The 'Seasons' map uses seasonal icons and weather descriptions. The 'HEALTH' map is a complex web of health-related terms. The 'ME' map is a highly detailed personal development map. The 'Shops' map categorizes shops into 2D and 3D types. The 'Coggle' map is a simple seasonal overview.

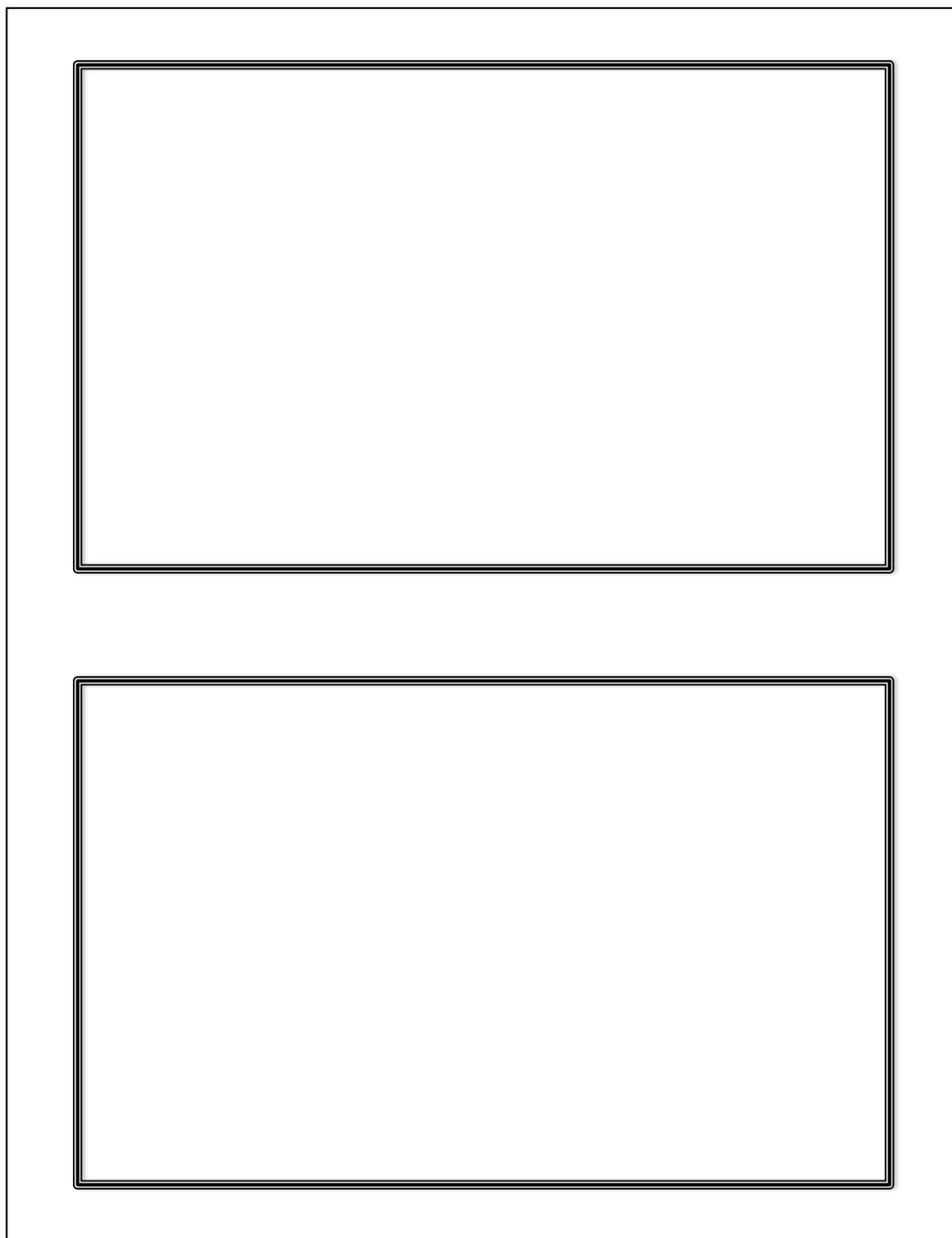
Lesson Materials 1.1
Notebook Page Template: ASL Signs
This was added during implementation and is not mentioned in the lesson plan.



Lesson Materials 1.1

Notebook Page: Splash Page Template (2 handouts per sheet)

This was added during implementation and is not mentioned in the lesson plan.



Lesson Materials 1.1

Notebook Page: Cornell Method Template (2 handouts per sheet)

This was added during implementation and is not mentioned in the lesson plan.

Date:		
Topic:		

Date:		
Topic:		

Lesson Materials 1.1

My Sample Pictures on the Blendspace Website

This was added during implementation and is not mentioned in the lesson plan.

The screenshot shows the Blendspace website interface. At the top left, there are logos for 'tes' and 'blendspace'. Below these are navigation options: 'Standards', 'Themes', 'Play', 'Print', and 'Autosaved'. On the top right, there are user profile icons for 'Tips', 'mashungas', and 'No Subject!', along with a 'Share' button and a '42' notification. The main content area is titled 'My Notebook Pages' and displays a grid of seven notebook pages. Each page has a number and a prompt 'Enter description/notes' with a small 'Add' button. The pages contain various handwritten notes and diagrams:

- Page 1:** A list of items with checkboxes.
- Page 2:** A diagram of a cube with labels and a definition: 'data-billing is the act of writing down important information to review with history the notes.'
- Page 3:** A blank page with a grid.
- Page 4:** A page titled 'Strategies' with a list: '→ Cornell Notes', '→ Mind Maps', '→ Outline Notes'.
- Page 5:** A page with several sticky notes and diagrams.
- Page 6:** A page with a grid and handwritten notes.
- Page 7:** A page with several sticky notes.

At the bottom of the grid, there is an 'Add row' button. On the right side of the interface, there is a vertical toolbar with various icons for editing and sharing.

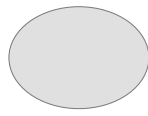
Lesson Materials 1.2
Mini Lesson A
"How to Make a Mind Map" PowerPoint Slideshow

Mind Map


—

Learn how to make a mind map


1. Draw a CIRCLE in the center.



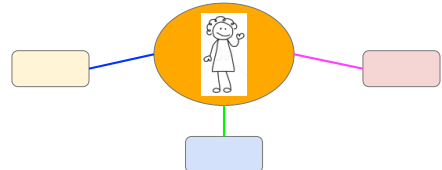
2. Draw a PICTURE for your central idea.



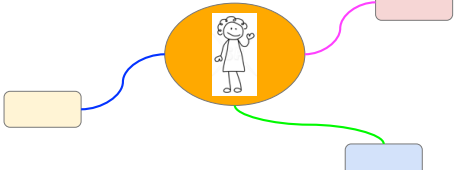
3. Use COLOR.



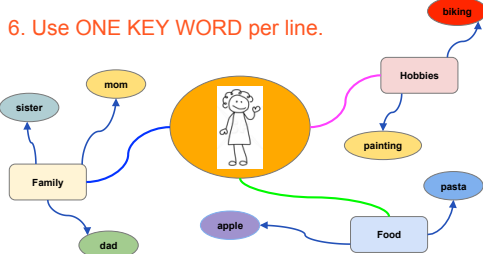
4. CONNECT branches to your central idea.



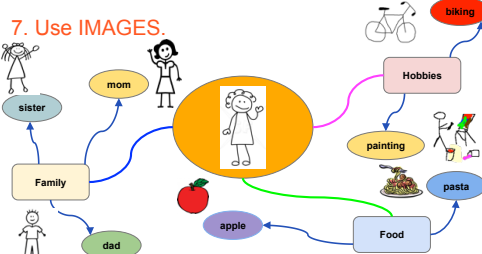
5. Make your lines CURVED.



6. Use ONE KEY WORD per line.



7. Use IMAGES.



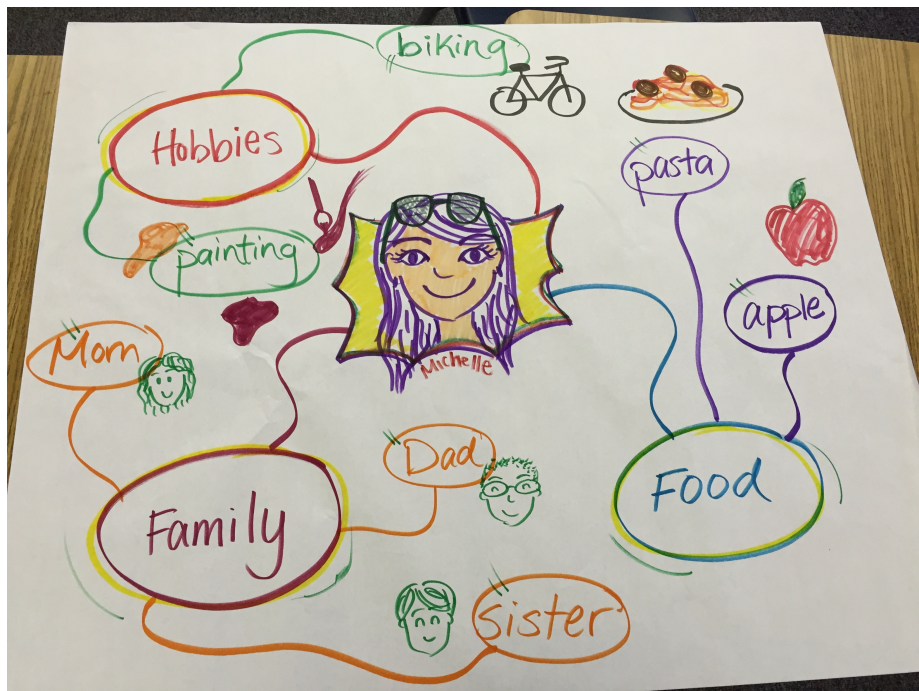
Lesson Materials 1.2
Mini Lesson A: Making a Mind Map
 Mind Mapping Template

Things to consider:

- ✓ Can be neatened up later by recreating the map on a program such as draw.io
- ✗ May be difficult if unsure of lecture structure in advance

HOW TO

Lesson Materials 1.2
Mini Lesson A: Making a Mind Map
 Teacher's Example Using Mind Mapping Method



Lesson Materials 1.2
Mini Lesson B: Making an Outline Note
 Outline Method Template

HOW TO

General points →

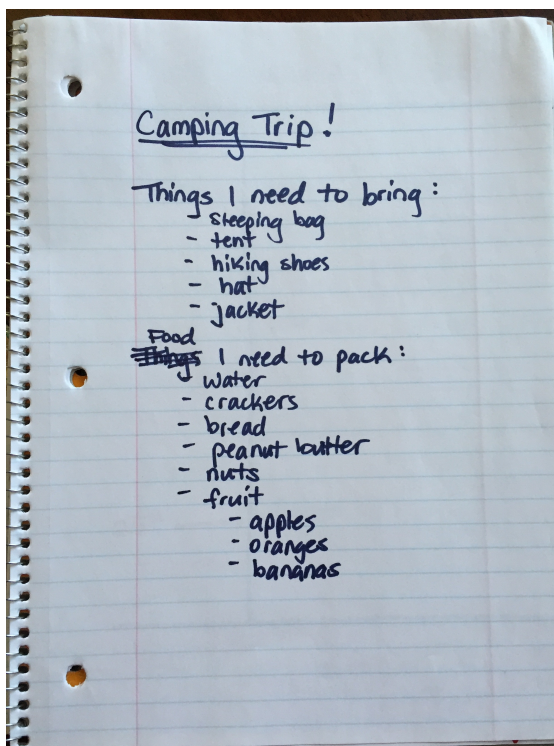
These concepts always apply to the sub-level above →

Specific details here →

Things to consider:

- ✓ Main points can be easily turned into questions during review time
- ✗ Doesn't show relationships or connectedness between arguments

Lesson Materials 1.2
Mini Lesson B: Making an Outline Note
 Teacher's Example Using Outline Method



Incomplete and not implemented due to time constraints

Lesson Materials 1.2
Mini Lesson C: Making a Cornell Note
 Cornell Method Template

HOW TO ① ② ③

Using an A4 notebook, rule off 3 sections as shown:

Things to consider:

- ✓ Printable Cornell notepaper is available online
- ✗ This method requires extra time to complete the summary column

Lesson Materials 1.2
Mini Lesson C: Making a Cornell Note
 Teacher's Example Using the Cornell Method

Incomplete and not implemented due to time constraints

Lesson Materials 1.3

Examples of Notes in Varying Qualities of Work

Skipped due to time constraints

Lesson Materials 1.3

Student-Generated Rubric for Writing Notes

Skipped due to time constraints

Lesson Materials 2.1

Sal Khan's Ted Talk "Let's use video to reinvent education"

The screenshot shows the TED website interface. At the top, the TED logo and tagline "Ideas worth spreading" are on the left, and navigation links (WATCH, DISCOVER, ATTEND, PARTICIPATE, ABOUT, LOG IN) and a search icon are on the right. The main content area features a video player for Salman Khan's talk "Let's use video to reinvent education". The video title is prominently displayed in white text on a dark background. Below the title, it indicates the talk was filmed in March 2011 and has 43 subtitle languages. A play button is centered over the video player. To the right of the video player, there are interactive options: "Watch later", "Favorite", "Download", and "Rate". A "Watch next..." section suggests the next video, "Arthur Benjamin: Teach statistics before calculus!". Below the video player, there are social sharing options (Facebook, Twitter, Email, Embed, More) and a total view count of 4,130,387. A section titled "Share this idea" is also present. At the bottom right, there is a sponsored section for IBM with the text "TED Talks are free thanks to support from" and a thumbnail for a video titled "Cognitive finance is here."

The link to the video online is

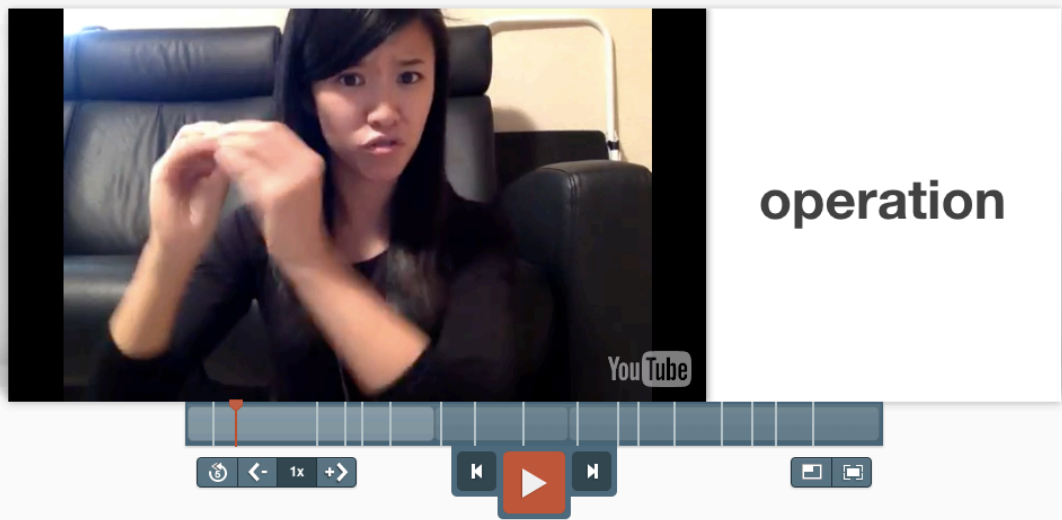
https://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education?language=en.

This video was not shown due to time constraints.

Lesson Materials 2.2
Mini Lesson A: Using the Mind Mapping Method
"Common Math Words" Video (on Zaption.com)

Common Math Words PRESENT SHARE ANALYTICS ⚙️

Author: Michelle Chung Published: May 4th, 2016 Length: 04:44



The video player displays a woman with long dark hair, wearing a black top, sitting in a black leather chair. She is gesturing with her hands as if explaining something. To her right, a white rectangular box contains the word "operation" in a bold, black, sans-serif font. The video player interface includes a progress bar, a play button, and other standard controls.

The link to this video is

<https://www.zaption.com/lessons/572aa72b33604a55653e9b49>.

Lesson Materials 2.2
Mini Lesson B: Using the Outline Method
 “Intro to Exponents” Video (on Zaption.com)

Intro to Exponents PRESENT SHARE ANALYTICS ⚙️

Author: Michelle Chung Published: May 2nd, 2016 Length: 04:16

$2 \times 3 = 2 + 2 + 2 = 6$

Exponent

$2^3 = 2 \cdot 2 \cdot 2 = 8$

$3^2 = 3 \cdot 3 = 9$

$5^4 = 5 \cdot 5 \cdot 5 \cdot 5 =$

25 x 5

SUBMIT

So what is this going to be?

RECORDED WITH SCREENCAST MATIC

YouTube

⏮️ ⏪ 1x ⏩ ⏭

The link to the video is

<https://www.zaption.com/lessons/572825fe16860abd2733d6c2>.

This video was readily made, but was not used in the implementation due to time constraints

Lesson Materials 2.2
Mini Lesson C: Using the Cornell Method

No video was made yet for this mini lesson and this mini lesson was incomplete due to time constraints.

Lesson Materials 3.1
Matching Activity: Types of Think-Aloud and Definitions

Predicting	to make something more clearly understandable or to make clear of something confusing
Making connections	to express the main points of something in a concise form
Visualizing	to connect your background knowledge or experience to what you have learned
Rereading	to create a mental picture
Clarifying	to ask questions of something or to object about something
Commenting	to express a thought or an opinion about something
Questioning	to read again to understand a text or to pick up some missing information
Summarizing	to guess what will happen in the future or will be a consequence of something

This was not implemented due to time constraints.

Lesson Materials 3.2
Thinking Aloud Observation Sheet

Name _____
Date _____

**THINKING ALOUD
OBSERVATION SHEET**

Watch the video carefully. Tally every time you saw me say any of those types of think-alouds. Record at least one example for each type of think-aloud.

TYPES OF THINK-ALOUNDS	TALLY	EXAMPLES
Predicting		
Questioning		
Clarifying		
Making connections		
Rereading		
Visualizing		
Summarizing		
Commenting		

This was not implemented due to time constraints.

Lesson Materials 3.1
Thinking Stems Observation Sheet

Name: _____
Date: _____

**THINKING STEMS
OBSERVATION SHEET**

Watch the video carefully. Tally every time you saw me say any of those thinking stems.

THINKING STEMS	TALLY
I'm thinking...	
I'm wondering...	
I'm noticing ...	
I'm picturing ...	
I'm predicting ...	
I just learned ...	
I'm figuring out ...	
This is confusing because ...	
The question I have is...	
I want to know...	
What I'm going to do next is ...	
I don't understand ...	
What would happen if ...	
What information do I need ...	
Why does ...	

This was not implemented due to time constraints.

Post-Assessment Materials
 Post-Assessment Problem Sheets
(same as the Pre-Assessment Problem Sheets)

Name: _____

Draw a line to connect the words and symbols.

Addition •	• × •	• Divide
Multiplication •	• – •	• Subtract
Subtraction •	• ÷ •	• Add
Division •	• + •	• Multiply

Name: _____

Draw a line to connect the words and symbols.

Addition •	• × •	• Divide
Multiplication •	• – •	• Subtract
Subtraction •	• ÷ •	• Add
Division •	• + •	• Multiply

Name: _____

What is the word for the number or symbol in bold?

Fill in the blank (use each word only once).

parentheses	sum	number	quotient
difference	equal	product	exponent

$4 + 5 = \mathbf{7}$ _____

$3^{\mathbf{2}} + 1 = 10$ _____

$7 \times 2 = \mathbf{14}$ _____

$4 - 3 = \mathbf{1}$ _____

$10 \div 2 = \mathbf{5}$ _____

$(3 + 1) \times 2 = \mathbf{8}$ _____

Name: _____

What is the word for the number or symbol in bold?

Fill in the blank (use each word only once).

parentheses	sum	number	quotient
difference	equal	product	exponent

$4 + 5 = \mathbf{7}$ _____

$3^{\mathbf{2}} + 1 = 10$ _____

$7 \times 2 = \mathbf{14}$ _____

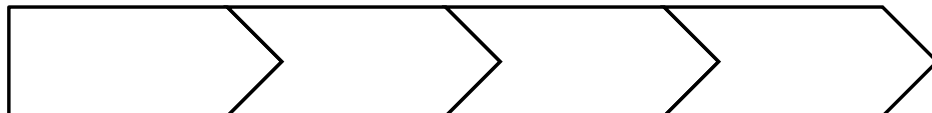
$4 - 3 = \mathbf{1}$ _____

$10 \div 2 = \mathbf{5}$ _____

$(3 + 1) \times 2 = \mathbf{8}$ _____

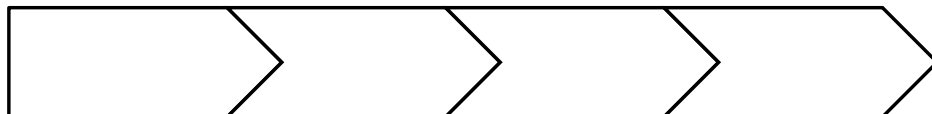
Name: _____

Cut and paste the operations in the correct order.



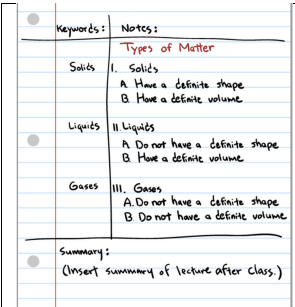
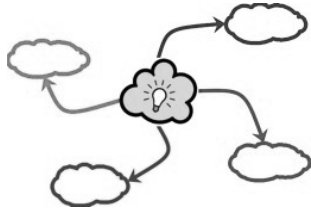
Name: _____

Cut and paste the operations in the correct order.



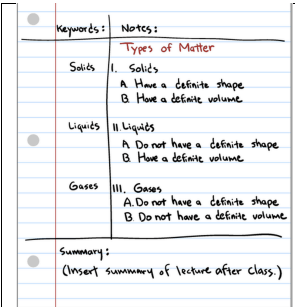
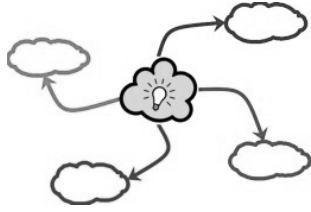
Name: _____

Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
		<p>I. MAIN IDEA</p> <p>A. _____</p> <p>1. _____</p> <p>2. _____</p> <p style="padding-left: 20px;">a. _____</p> <p style="padding-left: 20px;">b. _____</p>

Name: _____

Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
		<p>I. MAIN IDEA</p> <p>A. _____</p> <p>1. _____</p> <p>2. _____</p> <p style="padding-left: 20px;">a. _____</p> <p style="padding-left: 20px;">b. _____</p>

Name: _____

Solve each expression.

$3^2 =$	$2 \times 3 \div 2 =$	$3 + 5 - 2 =$
$2 \times (3 + 2) =$	$10 - 4 \times 2 =$	$6 \div 2 - 3 =$
$1 + 2 \times 3 =$	$2^2 + 1 =$	$2 \times 2 + 2 \times 2 =$

Name: _____

Solve each expression.

$3^2 =$	$2 \times 3 \div 2 =$	$3 + 5 - 2 =$
$2 \times (3 + 2) =$	$10 - 4 \times 2 =$	$6 \div 2 - 3 =$
$1 + 2 \times 3 =$	$2^2 + 1 =$	$2 \times 2 + 2 \times 2 =$

Post-Assessment
Post-Implementation Interview

Student Name: _____
Date of Interview: _____

POST-IMPLEMENTATION INTERVIEW

1. After all you learned and did during my curriculum implementation, did your view on math change? If yes, how so?

2. How do you like my Zaption videos? Do you like them or not?

3. Would you watch a Zaption video again to re-learn its math topic? Why or why not?

4. Out of the three note-taking strategies that you have learned, which one do you like the most to use for taking notes and why?

5. After learning the three note-taking strategies, do you think you will be more likely to take notes in your future classes? Why or why not?

6. How do you feel about the flipped classroom (watching videos to learn and take notes and participating more in-class activities)? Do you like it or would you rather go back to the traditional classroom? Why?

This was not implemented due to time constraints.

APPENDIX C: Students' Artifacts

For this thesis publication, I will only show the work of the two students, Cinderella and Venom, for all the parts of the curriculum implementation. I will also include the work of the other two students, Batman and Minnie Mouse, only if available, but they do not have much to show since Batman did not do much work and Minnie Mouse was absent many times. Please keep in mind that this student's results are not an accurate representation for all the four students in my curriculum implementation.

Students' Artifacts: Pre-Assessment Problem Sheets
Student: Cinderella

Name: _____

Cinderella

Draw a line to connect the words and symbols.

Addition •	• × •	Divide
Multiplication •	• - •	Subtract
Subtraction •	• ÷ •	Add
Division •	• + •	Multiply

What is the word for the number or symbol in bold?
 Fill in the blank (use each word only once).

parentheses	sum	number	quotient
difference	equal	product	exponent

$4 + 5 = \mathbf{7}$

number

$3^{\mathbf{2}} + 1 = 10$

exponent

$7 \times 2 = \mathbf{14}$

quotient

$4 - 3 = \mathbf{1}$

sum

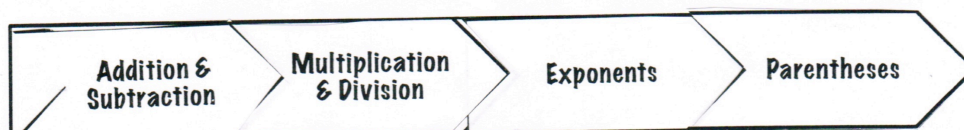
$10 \div 2 = \mathbf{5}$

product

$(3 + 1) \times 2 = 8$

difference

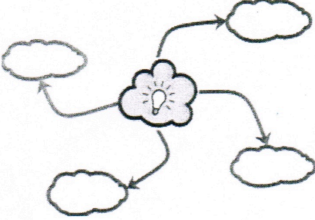
Cut and paste the operations in the correct order.



Cinderella

Name: _____

Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
<p>Keywords: Notes:</p> <p>Types of Matter</p> <p>Solids I. Solids A. Have a definite shape B. Have a definite volume</p> <p>Liquids II. Liquids A. Do not have a definite shape B. Have a definite volume</p> <p>Gases III. Gases A. Do not have a definite shape B. Do not have a definite volume</p> <p>Summary: (Insert summary of lecture after class.)</p>		<p>I. MAIN IDEA</p> <p>A. <u>T.V</u></p> <p>1. <u>B</u></p> <p>2. <u>A</u></p> <p>a. <u>A</u></p> <p>b. _____</p>

NAME: _____

Solve each expression.

$3^2 = \emptyset$	$2 \times 3 \div 2 = \emptyset$	$3 + 5 - 2 = \emptyset$
$2 \times (3 + 2) = \emptyset$	$10 - 4 \times 2 = \emptyset$	$6 \div 2 - 3 = \emptyset$
$1 + 2 \times 3 = \emptyset$	$2^2 + 1 = \emptyset$	$2 \times 2 + 2 \times 2 = \emptyset$

Students' Artifacts: Pre-Assessment Problem Sheets
Student: Venom

Name

Venom

Draw a line to connect the words and symbols.

Addition •	• × •	• Divide
Multiplication •	• - •	• Subtract
Subtraction •	• ÷ •	• Add
Division •	• + •	• Multiply

(Note: Lines connect Addition to Subtract, Multiplication to Multiply, Subtraction to Add, and Division to Divide.)

What is the word for the number or symbol in bold?
 Fill in the blank (use each word only once).

parentheses	sum	number	quotient
difference	equal	product	exponent

$4 + 5 = \mathbf{7}$ number

$3^{\mathbf{2}} + 1 = 10$ parentheses

$7 \times 2 = \mathbf{14}$ parentheses

$4 - 3 = \mathbf{1}$ quotient

$10 \div 2 = \mathbf{5}$ Equal

$(\mathbf{3 + 1}) \times 2 = 8$ Sum

Cut and paste the operations in the correct order.

Addition & Subtraction

Multiplication & Division

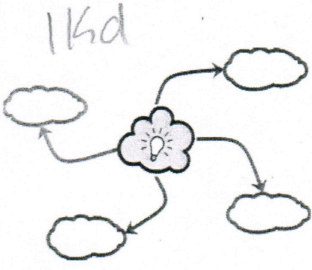
Exponents

Parentheses

Venom

Name: _____

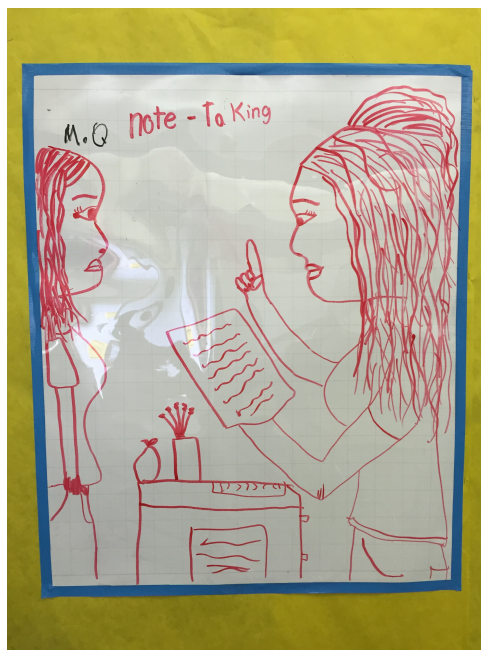
Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
<p>Keywords: Notes:</p> <p>Types of Matter</p> <p>Solids I. Solids A. Have a definite shape B. Have a definite volume</p> <p>Liquids II. Liquids A. Do not have a definite shape B. Have a definite volume</p> <p>Gases III. Gases A. Do not have a definite shape B. Do not have a definite volume</p> <p>Summary: (Insert summary of lecture after class.)</p>	<p>1kd</p> 	<p>I. MAIN IDEA</p> <p>A. _____</p> <p>1. _____</p> <p>2. _____</p> <p>a. _____</p> <p>b. _____</p>

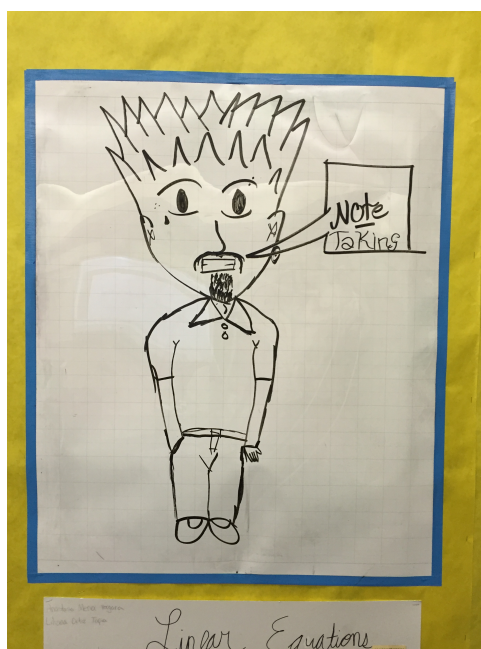
Solve each expression.

$3^2 = 7$	$2 \times 3 \div 2 = ?$	$3 + 5 - 2 = 6$
$2 \times (3 + 2) = 7$	$10 - 4 \times 2 = ?$	$6 \div 2 - 3 = 0$
$1 + 2 \times 3 = 6$	$2^2 + 1 = 5$	$2 \times 2 + 2 \times 2 = 8$

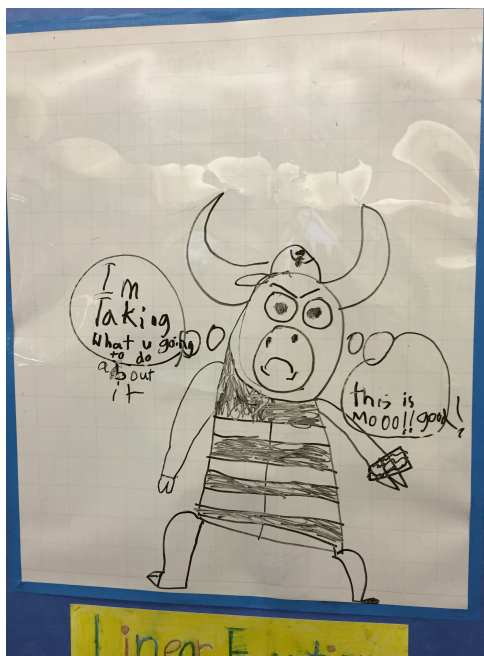
Students' Artifacts: Quickdraws (Lesson 1.1)
Student: Cinderella



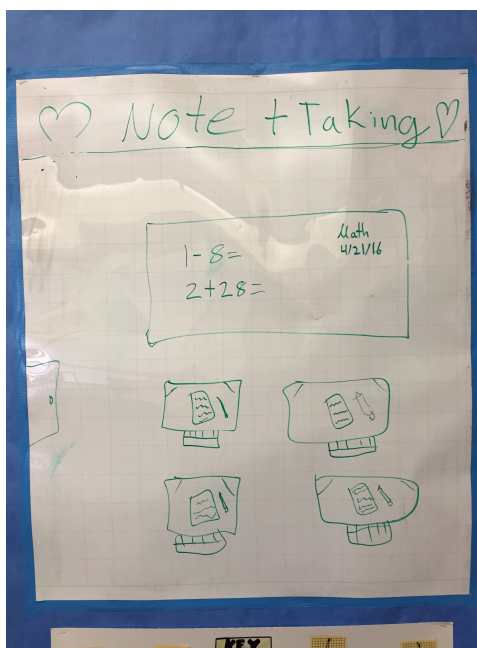
Students' Artifacts: Quickdraws (Lesson 1.1)
Student: Venom



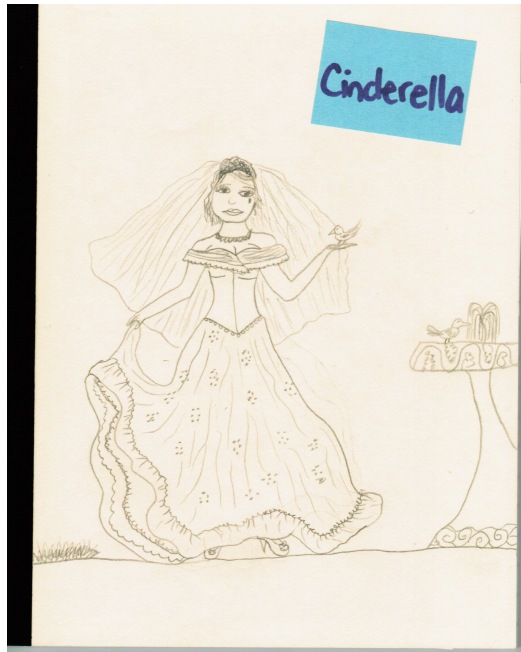
Students' Artifacts: Quickdraws (Lesson 1.1)
Student: Batman



Students' Artifacts: Quickdraws (Lesson 1.1)
Student: Minnie Mouse

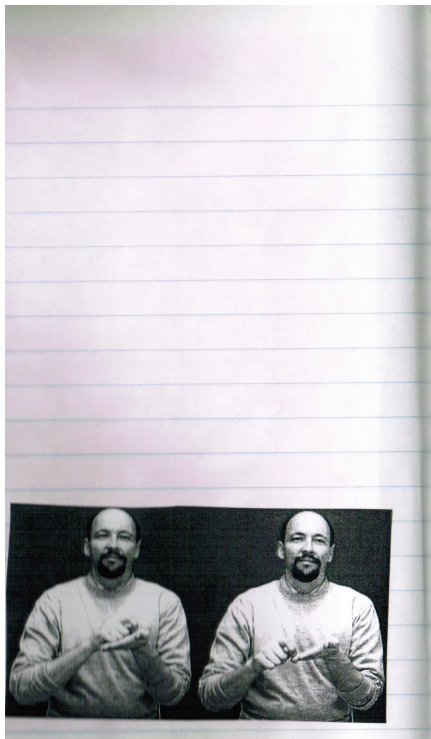


Students' Artifacts: Notebook Pages
Student: Cinderella



UNIT TITLE: Cinderella

Page #	Page Title
1	What is note-taking?
2	Why do we take notes
3	note-taking strategies title page
4	mind maps examples
5	Cornell notes examples
6	outline notes examples
7	

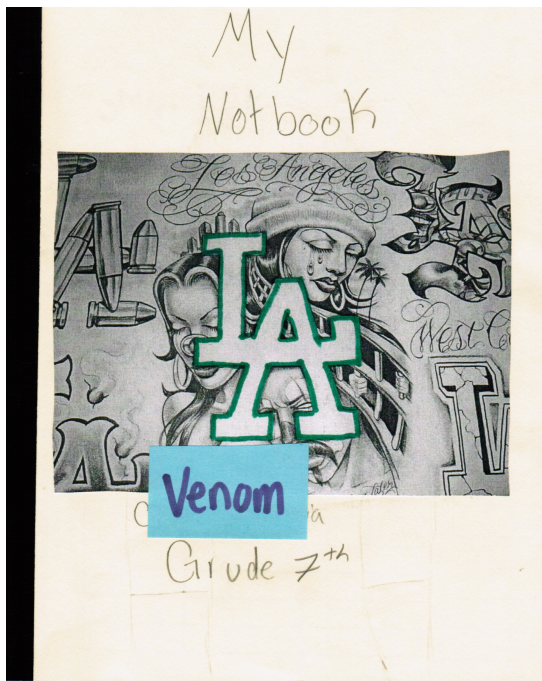


What is note-taking?

wh I think it is:

What it is:
note-taking is the act of writing down important information to review and study for later

Students' Artifacts: Notebook Pages
Student: Venom



Venom

UNIT (1) **TITLE:** Note-taking strategies

Page #	Page Title
1	What is note-taking?
2	Why do we take notes
3	Note-taking strategies
4	Mind map examples
5	Cornell notes examples
6	outline notes examples
7	

What is Note-taking?

what I think it is:

Venom

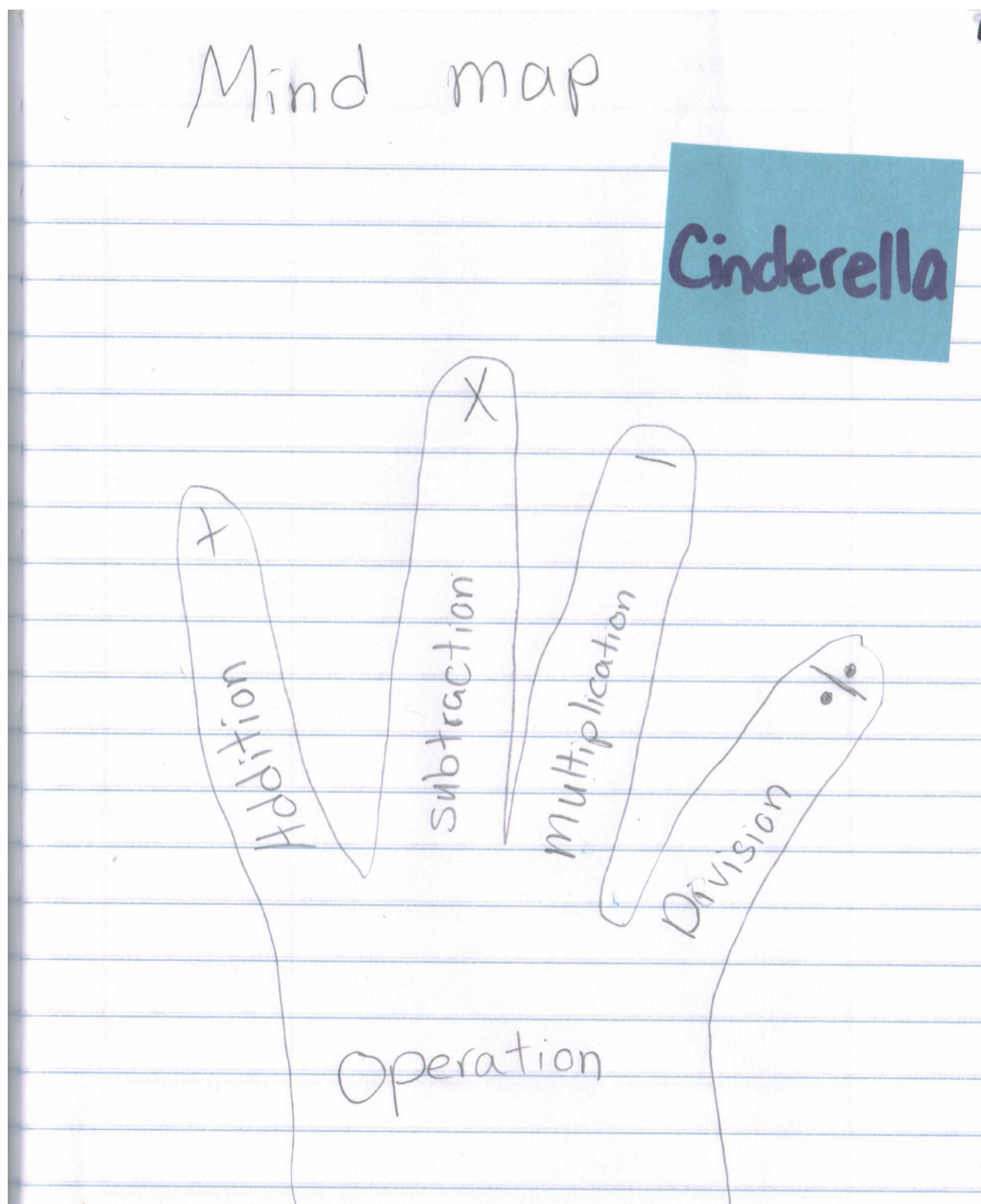
What it is:

Note-taking is the act of writing down import information to review and study so later.

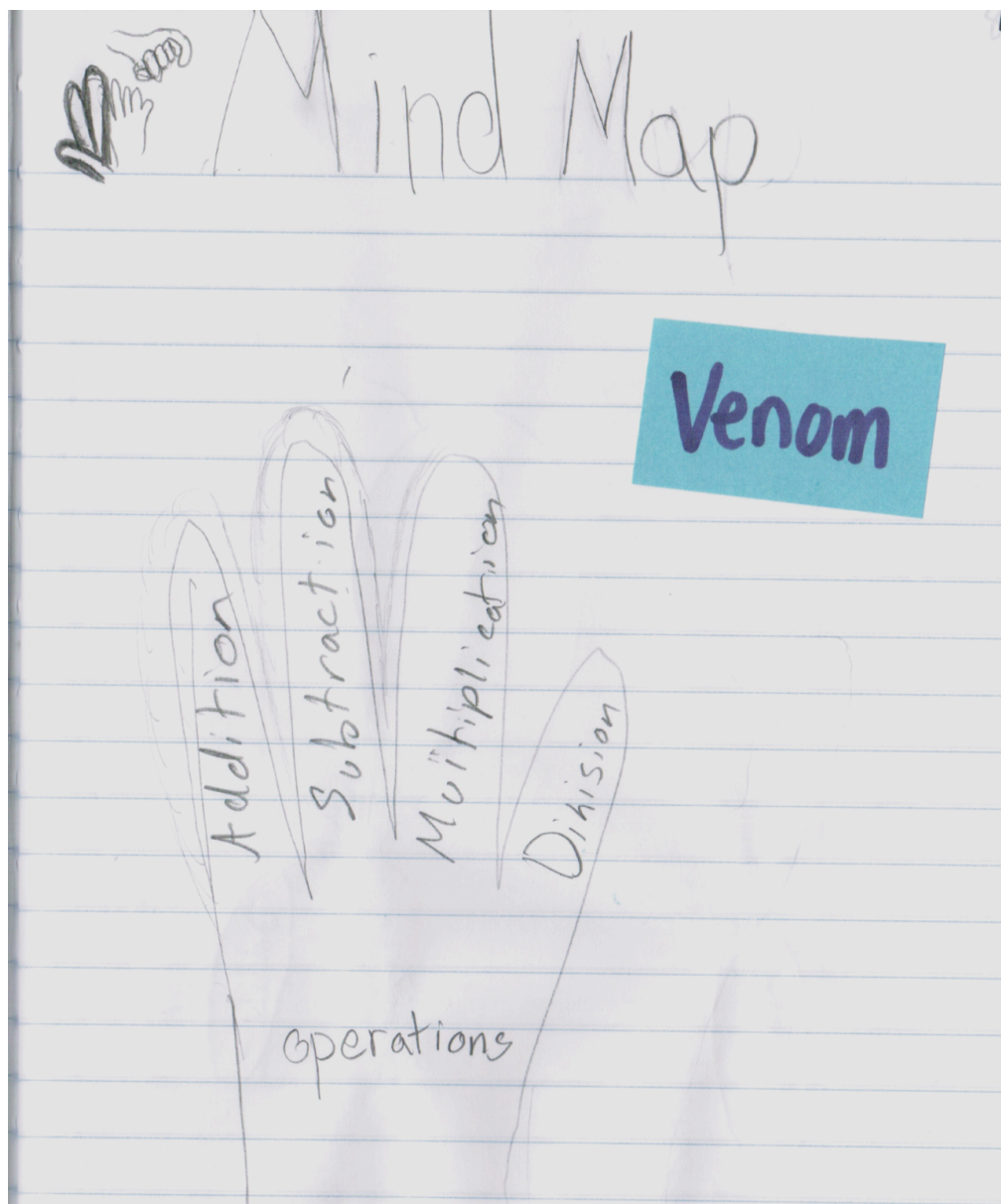
Mind Map

Venom

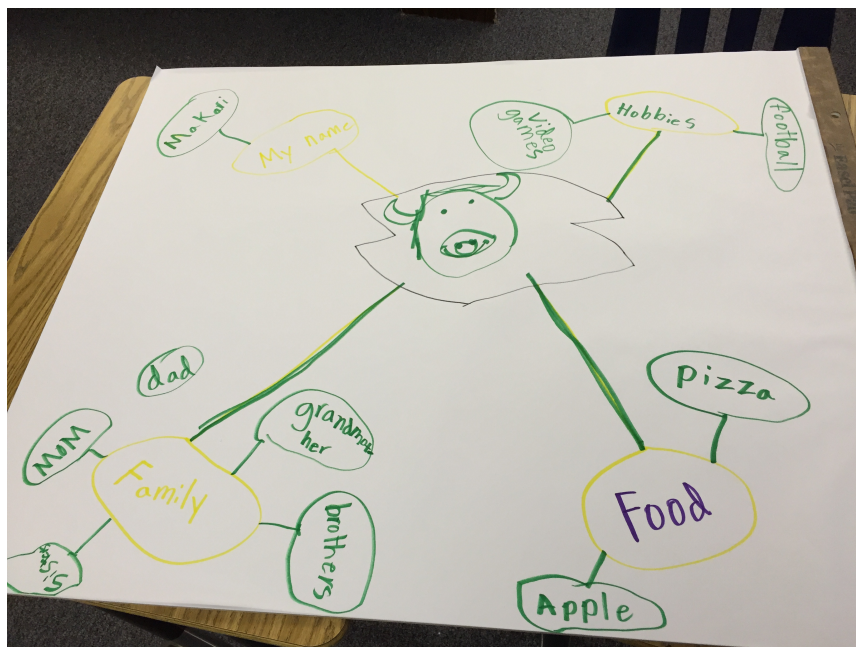
Students' Artifacts: Hand-Shaped Mind Map (Lesson #)
Student: Cinderella



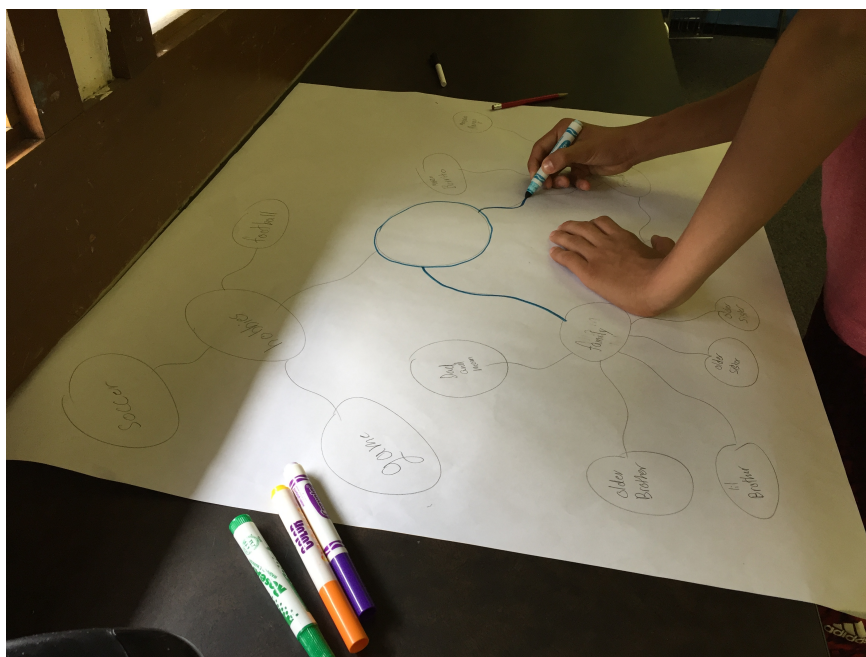
Students' Artifacts: Hand-Shaped Mind Map (Lesson #)
Student: Venom



Students' Artifacts: Mind Map
Student: Batman

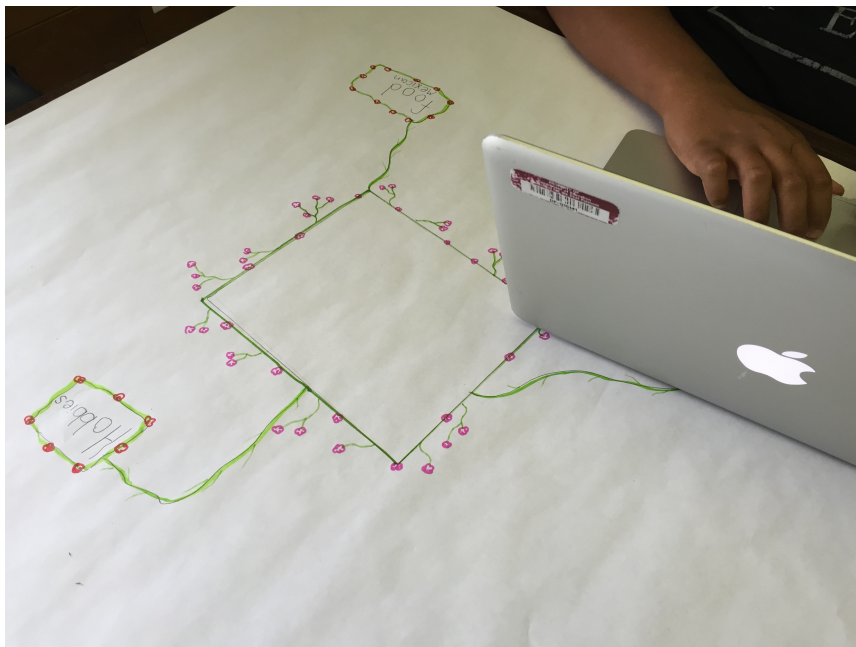


Students' Artifacts: Mind Map
Student: Venom



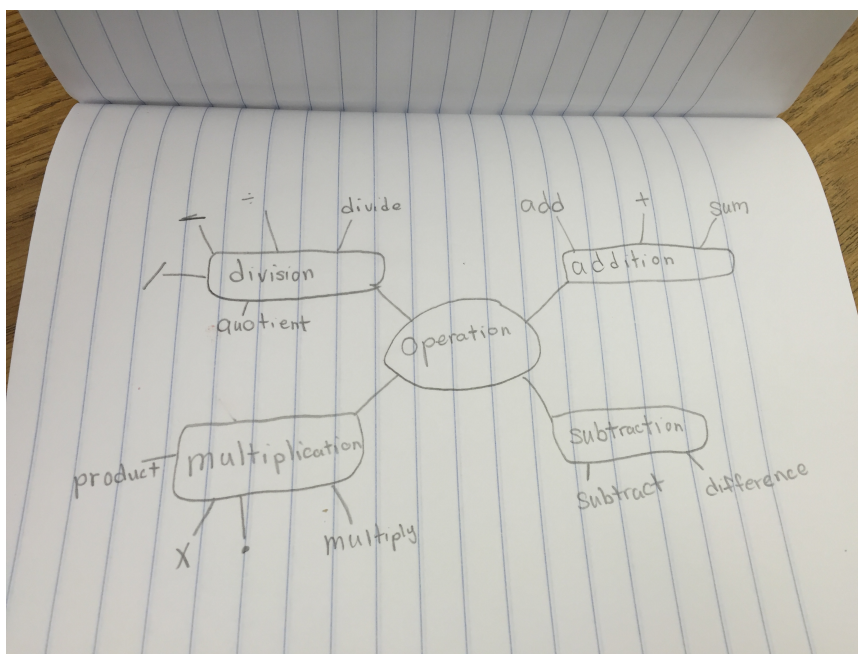
***Note: A picture evidence of Venom's finished mind map is missing.

Students' Artifacts: Mind Map
Student: Cinderella



***Note: A picture evidence of Cinderella's finished mind map is missing.

Students' Artifacts: "Operations" Mind Map
Student: Cinderella



Students' Artifacts: Post-Assessment Problem Sheets
Student: Cinderella

Name: _____

Cinderella

Draw a line to connect the words and symbols.

Addition	×	Divide
Multiplication	-	Subtract
Subtraction	÷	Add
Division	+	Multiply

(Note: Red lines connect Addition to Subtract, Multiplication to Divide, Subtraction to Add, and Division to Multiply.)

Name: _____

Cinderella

What is the word for the number or symbol in bold?
 Fill in the blank (use each word only once).

parentheses	sum	number	quotient
difference	equal	product	exponent

$$4 + 5 = \mathbf{7}$$

Sum

~~$$3^2 + 1 = 10$$~~

$$7 \times 2 = \mathbf{14}$$

product

$$4 - 3 = \mathbf{1}$$

difference

$$10 \div 2 = \mathbf{5}$$

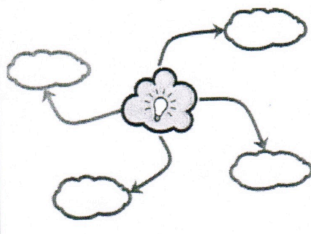
quotient

~~$$(3 + 1) \times 2 = 8$$~~

Cinderella

Name: _____

Write the correct name of the note-taking strategies in the boxes below the pictures.

Mind Map	Outline Notes	Cornell Notes
<p>Keywords: Notes:</p> <p>Types of Matter</p> <p>Solids I. Solids A. Have a definite shape B. Have a definite volume</p> <p>Liquids II. Liquids A. Do not have a definite shape B. Have a definite volume</p> <p>Gases III. Gases A. Do not have a definite shape B. Do not have a definite volume</p> <p>Summary: (Insert summary of lecture after class.)</p>		<p>I. MAIN IDEA</p> <p>A. _____</p> <p>1. _____</p> <p>2. _____</p> <p> a. _____</p> <p> b. _____</p>
<p>Cornell notes</p>	<p>mind map</p>	<p>to outline notes</p>