

## **3D Women Writers: Overcoming Obstacles in the Writing Game**

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### **INTRODUCTION**

My teaching experiences continue to reveal a definite pattern found in a “successful” mathematics classroom: (1) the math concepts are taught so that they are entertaining for students and teachers, (2) concepts are easy for students to grasp and remember, and (3) the teacher always provides a connection for students to take what they have learned and apply it into their everyday lives. This unit will explore the themes found in literature written by multicultural women writers. The themes of overcoming obstacles and healing are very common in literature written by women of color. In addition, this unit will review biographies of women who have pursued mathematics and see if these common themes also exist in mathematical literature. Students will be challenged to create their own stories about culture, overcoming obstacles, and healing using mathematical techniques they learn in the activities included in this unit.

If there are relatively few women mathematicians, there are even fewer black, Hispanic, and Native American mathematicians. Why? Some have argued that being a mathematician is a kind of luxury, one that many minorities feel they cannot afford (Henrion 188). Most of the literature pertaining to female mathematicians contains life-story material about their experiences growing up, their hopes or dreams to study mathematics, the obstacles they faced as they pursued their dream, how they healed, and what it is like now for the women who are alive. When Shirley Mathis McBay was in high school, she walked a mile and a half to get to the school for black students. She walked by a park that she could have walked through, but that was one risk Shirley knew she could not take because she was black. Shirley’s healing came from the matriarch of her mother’s family (Verheyden-Hillard, *Mathematician and Administrator: Shirley Mathis McBay* 18). By teaching this unit, I hope to promote an appreciation for women of different cultural backgrounds who have made significant contributions to writing and mathematics. I am hopeful that students will gain more appreciation for their cultural heritage. I want the students to get involved with how there are healing aspects in all cultures, and that these are very much accessible when we are faced with obstacles.

The main purpose for writing this unit is to teach students a mathematical process they can use to write their own multicultural stories that involve women overcoming obstacles and healing.

## UNIT OVERVIEW

The themes of my unit are centered on multicultural women writers, healing and overcoming obstacles. To help the students understand the themes of the unit, I am using the following reading sources: *Mama Day*, by Gloria Naylor, “Beacon Hill,” by Elizabeth Brown-Guillory’s, and *Peel My Love Like and Onion*, by Ana Castillo. I’ve selected these readings for use in a compare and contrast activity where students will read biographies of women mathematicians to see if there are common themes in the books.

The mathematical literature used to teach this unit are four short stories from *American Women in Science Biographies*, by Mary Ellen Verheyden-Hillard, *Women in Mathematics*, *The Addition of Difference* by Claudia Henrion, and *Leaning Towards Infinity* by Sue Woolfe. All of the math literature focuses on women who have had to overcome obstacles and struggled to be recognized as contributors to mathematics. I am also including the Mathemagic book series by Margaret Ball and *The Math Book for Girls and Other Beings* by Valerie Wyatt. These books are for students who read below grade level. Excerpts from the preceding books will be discussed and compared to the themes found in Naylor’s, Brown-Guillory’s, and Castillo’s stories.

After students have discussed and understood the themes in the literature, I will introduce them to a poem called “Where I’m From” by George Ella Lyon and “My Name” by Cisneros. These two poems will help students begin looking at their identity and writing what they know about themselves. The students can choose from the two examples and write their own poems. Activities in this unit require students to discuss how they will plan their writing activities. The first step in doing the planning involves character development and setting. In order to develop their character(s), students will use a model called “Habits of Mind.” All of the students participating in this unit will research a list of 16 habits from a four-book series called *Habits of Mind: A Developmental Series* by Arthur L. Costa and Bena Kallick. This model is currently being used throughout my school campus and has been very effective in supporting teachers with a common language for measuring whether our students comprehend state-mandated curriculum objectives. The habits of mind help the teacher select key terminology so students encounter the words in everyday dialogue. We can formulate questions or statements that lead students to exercise certain habits of mind (Costa and Kallick 16). When students begin to add information about their character’s attributes, we will also discuss ways to gain parent support and how to get help within their communities. I will use the second book in the series, *Habits of Mind: Activating and Engaging*, because it contains a chapter on how to implement intelligent behaviors in the mathematics classroom. This curriculum unit will provide other types of literature to support interactive writing. Students will read *Choose Your Own Adventure* books by various authors. Most of the adventure stories deal with characters that overcome obstacles through the choices they make in the stories. These books are included solely for the purpose of developing the math students’ writing skills and for connecting mathematics and writing.

To help support students in writing about themselves and their culture, I am using George Ella Lyon's poem "Where I'm From." This poem will serve as a template for students as they write their own poems.

## **AUDIENCE**

### **A Small Learning Community**

The Ninth Grade Leadership Academy at Furr Senior High School is a bridge to support first-time ninth graders into the high school experience. It provides a safe space and climate in which to make the big moves ninth-graders are making—academically, emotionally, and socially. The Ninth Grade Leadership Academy helps to ensure that students have the skills, desire, and leadership qualities to succeed. It gives them an intensive academic experience and a level of support and encouragement only available in a small learning community. And, because of the flexibility a small learning community provides, teachers are uniquely able to help students overcome school adjustment issues. Our ninth-graders are housed for the most part in a separate building. It is estimated that there will be 130-150 students enrolled in the Ninth Grade Leadership Academy next year. All of the students will be "first-time" ninth graders. The small learning community is supported along with other academies within the entire school by a grant from the Annenberg Challenge A+ Foundation. This grant supports schools that are implementing the small learning community methods.

### **Faculty**

The faculty is made up of one algebra teacher, one social studies teacher, a health teacher, one biology teacher, an English teacher, and a teen leadership teacher. All academies require the support of an administrator. The ninth grade administrator is an assistant principal who is responsible for managing administrative procedures in our academy. All of the faculty share a common support period where they meet and collaborate about the academy activities and about teacher and student concerns. Each teacher will teach five classes in his/her core subjects, which makes the teacher-to-student ratio about 1:30.

### **Students**

The student body in the Ninth Grade Academy is ethnically comprised of 75% Mexican, 15% black 5% white and 5% other. These students come from middle schools within the district; there are three "feeder schools" to our high school. The activities in this curriculum unit will be delivered to students with different skill levels. Most of the students are on grade level, and there are special support services for students whose skill sets are below or above grade level.

The “content mastery student” receives special academic support outside of the classroom. These students require modified lessons and tests. In most cases these students tend to be visual learners and are below grade level in their “core” subjects (math, English and science). The content mastery student works with an academic support team comprised of a special education teacher, one or both parents, a district administrator, and the regular classroom teacher. Every six weeks a content mastery meeting is held to discuss the student’s needs and progress in the mainstream classroom.

This unit includes enrichment projects for students who are working above grade level who may be classified as “gifted/talented (G/T) students.” The gifted/talented student usually requires more challenging activities than what is taught in the regular classroom. Most of the activities for G/T students will be enrichment assignments that may or may not involve research projects. These students are likely to be more involved with computer technologies than other students, and will have the opportunity to expand on the concepts taught in this unit.

## **UNIT BENEFITS**

The activities in this unit will benefit the students as they begin to think about their own culture, women as contributors to math, and game story writing. All of these concepts combined make writing in the math classroom a motivational experience. Since one of the purposes of this curriculum unit is to motivate students to further explore “gaming mathematics,” students will be encouraged to channel the knowledge they gain from this unit into careers, such as media writing, computer programming, and multicultural game design and development.

The lessons presented in this unit could bring more interest and excitement to the students’ mathematical learning process. When students are motivated to learn, it is an added benefit when they approach new concepts. This unit supports the possibility of enrolling more girls into extended math activities. All of the participants of this unit will have the opportunity to see women as intelligent, capable math contributors and healers. This unit initiates parent and community involvement in the learning process by asking students to examine their cultures for healing aspects, identifying female contributors and multicultural writing. The overall benefit for teaching this unit is to heighten students’ awareness of the importance of learning mathematics. By proposing that women have much to contribute to the mathematical sciences, this unit has the possibility to enrich the students’ lives and bring added support to them and their communities.

## **AN OVERVIEW OF THE UNIT LEVELS**

There are four different levels to this unit. Below is an overview of each of the following unit levels: (1) “Reviewing the Literature of Multicultural Women Writers” begins by introducing students to books written by multicultural women writers who have experienced overcoming obstacles. Students will also read material written about or by

multicultural women mathematicians and how they overcame obstacles in order to gain recognition for their contributions to mathematics. Students will discuss the common themes found in both sets of books. (2) Level two involves students investigating how intelligent habits are defined in their culture. I will support my students in developing and defining what and how intelligent behaviors can be used as tools to support them as individuals and their story characters. We will use a model called “Habits of Mind”. These activities are for character building and will be used as a reference when they begin writing their own stories. (3) In “Introduce Interactive Writing,” a set of *Choose Your Own Adventure* books will be read with the introduction to interactive writing. The books selected have girls as main characters, and some of them were written by women. These support the writing style for interactive stories. (4) “Using Mathematics to Write Multicultural Interactive Stories:” the mathematical concepts involved in interactive writing combined with themes, characters and settings will support the students as they write their own multicultural stories. At this level students will examine how number sequencing, flowcharting symbols, and patterns are essential elements to the interactive story writing process (Burns 168). This level brings all of the concepts taught in the preceding levels together and connects them in a math-related writing activity.

### **LEVEL ONE: FINDING COMMON THEMES IN THE LITERATURE**

Initially, we will discuss literature involving the themes of overcoming obstacles, identity, and healing in *Mama Day*, a book by Gloria Naylor. This book will be the primary reading source for the students to gain an understanding of what healing and overcoming obstacles mean. Students will read excerpts from the book and listen to the audio version of *Mama Day*. This approach will help students start thinking about the main character for the stories they will eventually write. I will also include “Beacon Hill,” a story written by Elizabeth Brown-Guillory, and excerpts from two books written by Ana Castillo: *So Far From God* and *Peel My Love like an Onion*. These resources combined with writing activities will provide students with ideas for their own stories, themes, settings, and characters.

#### ***Mama Day* by Gloria Naylor: Introducing the Themes of the Unit**

Miranda in *Mama Day* is a healer who passes on her gifts or abilities to her descendants as a way of keeping the past alive. Students will identify how healers in the black community sometimes use parts of their bodies as healing instruments. According to Griffin, many black women writers seek to reconstitute their bodies as sites of healing, pleasure, and resistance, and thus engage in a project of what she calls re-imagining the black female body (Griffin 520). Griffin refers to this project as “textual healing” and sees it as a location of transformative possibility and pedagogical potential in black women’s literature (521). Miranda, the matriarch in *Mama Day*, is described as having “gifted hands” (Naylor 88). Her healing powers deal with the combinations of herbs for herbal medicine. There is also a reference to Sapphira’s hands throughout Naylor’s book. For example, in the Candle Walk tradition itself, a great deal of importance was put on

the giving of handmade gifts, “as long as it came from the earth and the work of your own hands” (Naylor 110). Miranda is a conjure woman. At age five, she demonstrated second sight by knowing that her baby sister Peace was going to drown in the well. She can tell what the weather will be by examining nature (Naylor 227). This story will set the foundation for students to start thinking about their own families and the women who would be like Miranda. This story will be presented using the audio version and essays, outlines, and excerpts from the book.

Prior to reading *Mama Day*, I will provide the students with a list of questions that will help them identify the themes in the story. For example, “Do you use two different names, one for home and the other for school?” This question is asked so that students can see that people sometimes have problems knowing their identity. Two other characters in *Mama Day* are George and Cocoa, whose real name is Ophelia. Cocoa’s name in Willow Springs is Ophelia, but to her husband George and her acquaintances in Manhattan, she is Cocoa. The character George could be described as a person who doesn’t know anything about his culture or “being black.” He was raised an orphan. He likes the Willow Springs Island, but does not always understand the things he observes there.

### **“Where I’m From” Writing Activity**

This writing activity allows students to write a poem entitled “Where I’m From,” patterned on George Ella Lyon’s version. The purpose for this activity is to help the students communicate about their identity. This is an example of the poem:

I’m from 3, 30 and 61,  
That was my first day to have some fun.

I’m from 9 digits in a row,  
They call that security for socializing you know.

I’m from the ratio 1 out of 3,  
I’m the first, and there are 2 younger than me.

I’m from a lady 5’4 and a guy standing six feet,  
I grew up on 700 Live Oak Street.

I’m from 100 miles north of here,  
A place where you can hear the Aggies cheer!

I’m from folks, who marched during 6 times tens,  
So they could have freedom back then.

I'm from many numbers twisted to make my DNA,  
Making me unique in every way.

I'm 4 decades plus two years old,  
When God made me he threw away the mold.

### **Biographies of Women Mathematicians**

Students may decide to focus their writing on using the mathematics contributed by multicultural women. The interactive writing that the students will do will involve an adventure that includes conflict and choices that the reader must make in order to overcome obstacles. According to Ruthsdotter, "There is a pervasive, yet totally incorrect assumption inculcated into students, that women have played no vital roles in the political, economic and social development of our American culture" (Ruthsdotter 1). The creative nature of interactive writing offers to the students a way to contribute their cultural perceptions in a format that is engaging and fun.

There are some commonalities as they pertain to themes found in multicultural women's literature and the biographies of women mathematicians. Students will review biographical math literature about women who study mathematics and identify the themes that bridge the multicultural women's experiences in writing and mathematics. This comparison will further set the tone for the writing activities in this unit. I want students to embrace and understand that we cannot afford to omit the stories of minority women in literature. Oversights like that, when they become the norm, negatively affect the developing attitudes of both sexes. "They deal an especially severe blow to the self-esteem of girls who are being taught by omission that women, people like themselves, do not achieve in the society" (Ruthsdotter 1).

For example, *Elma Gonzalez: Scientist with Determination* is a story about a girl whose family was made up of migrant farm workers. It also tells of how she had to leave school every spring to pick crops in the fields and did not return to school until late in the fall. Never giving up, she completed her education and went on to become an eminent scientist in charge of her own laboratory in Los Angeles. The so-called Eisenhower system of interstate highways begun during the 1950s has had disastrous effects on many small towns in America (Verheyden-Hillard, *Scientist With Determination: Elma Gonzalez* 8). Students can develop the interactive writing process by seeing her story as an adventure that begins with her being a migrant farm worker, and how she overcame all of the struggles and difficulties she faced to become a scientist and a mathematician. Students can compile a list of intelligent behaviors she used to succeed. Students may see how she was able to heal through her pursuit for higher mathematics. Tauntzia, a character in "Beacon Hill," is similar to Nancy Wallace, an Engineer from the Comanche Nation. Tauntzia calls Brandy to stay with her for a week in order to pass on the stories of their ancestors and teach her about herbs and healing. Nancy is instructed by her elders to participate in ancient dances where she wears a special Comanche dress even though

she doesn't really want to participate. (Verheyden-Hillard, *Engineer from the Comanche Nation* 12). Tauntzia spent all day telling Brandy stories about growing up on Beacon Hill and about her years in Bayou St. Claude. She told her about many healing remedies. She also talked about farm life and blustery cold winters (Brown-Guillory). Both girls, Brandy from Beacon Hill and Nancy from the Comanche Nation, learn to respect their cultures by experiencing wisdom and insights passed on to them by their elders.

### **Peel My Love Like an Onion: Carmen La Coja**

The main character and the themes in this book are very similar to the character and themes in *Mathematician and Computer Scientist, Caryn Navy*. Ana Castillo's main character in this novel is Carmen La Coja, which means "Carmen the Cripple." She had been a great flamenco dancer, but becomes crippled from a childhood bout with Polio. She explains the best part of flamenco, saying, "You don't have to have all your teeth or shiny hair. You just have to feel what you are doing to keep up with the rhythm, to lead and follow musicians" (Castillo 57). Carmen continues to get on the dance floor and dance until near the end of the book. The theme in both of these books is: don't give up. Caryn starts to lose her eyesight at ten years of age, but never gives up learning more about math and computers, and is eventually able to start her own business.

### **Leaning Towards Infinity: The Story of a Mother and Daughter who are Mathematicians**

Mother and daughter relationships are a subject that women often write about. Usually, the themes of finding their identity and the obstacles they must face in order to find themselves are apparent. I have selected *Leaning Towards Infinity: A Novel* by Sue Woolfe. It is a mathematical fiction story about two women, a mother and daughter, who are both gifted mathematicians. The mother who is called Juanita in the story refuses to acknowledge her daughter's genius. According to Foster, "Daughters find their voices through interaction with their mothers. For the daughters, their mothers' stories allow them to finally understand their "ancestry and themselves" (Foster 210). Frances is the daughter of Juanita in *Leaning Towards Infinity*, and she cries, "I could have said a thousand things to my mother but we had been strangers all of our lives" (Woolfe 293). Juanita, the mother, believes that Matti, her only son, is the one she should be coaching with a new math formula, because he is a man; however, he shows no aptitude.

Feeling her mother's unhappiness to be her fault, Frances develops a guilt complex; she secretly studies all her mother's mathematical papers and conjectures and arrives at a theory. Frances travels to Athens to present her theory at a mathematical convention, hoping to establish her mother's brilliant daughter at last (Woolfe 88).

The lack of communication between mother and daughter lasts for generations in this story, with healing coming from the daughter's attempt to solve all of the unfinished



mathematical theories her mother leaves behind when she dies. I will suggest to the students who participate in learning the concepts in this unit that they write about their relationships with their mothers and identify the themes that exist in their relationships.

### ***Proof: A Play About a Girl Mathematician***

I have included this play as a way for students to creatively express themselves as they learn about the common themes found in multicultural women’s literature, and biographies about women mathematicians. *Proof* is a play about a young woman who had taken care of her mathematician-father for several years prior to his death, which came after a long bout with mental illness. In the play, Catherine has been trained (up to a certain point) as a mathematician, so a question is raised and tackled in the play—can a woman really do highly original work (Auburn 30)? There will be discussions about how girls feel about mathematics, and why girls should try to pursue mathematics. “Pursuing mathematics meant beginning a journey through unmapped territory. It was hard work; I was no one’s fair-haired boy” (Henrion 213).

## **LEVEL TWO: BUILDING INTELLIGENT CHARACTER ATTRIBUTES**

Lewinski states that “every good game story needs interesting characters. All characters have special skills and strengths that the writer must explain clearly to the person who will be using the game (Lewinski 18). This level of the unit will focus on how to develop character attributes for healing, overcoming obstacles, and survival in a game. Students will have an opportunity to plan their character attributes before they begin to write their game stories. At this point we have reviewed and defined some common themes of our characters—strong, reliable, family-oriented. . .etc. The questions that are used for discussion are: What are your intelligent attributes? If you had to write down the intelligent attributes of one of the multicultural women we have discussed in this unit, what would you put on your list?

### **Habits of Mind: Defining Intelligent Behaviors for Multicultural Women Characters**

Having a “habit of mind” means having a disposition toward behaving intelligently when confronted with problems, the answers to which are not immediately known (Costa and Kallick, Home Page). This list of habits will be used as a way to communicate and interpret intelligent behaviors and what they mean. Students will be involved in activities where they are creating their culturally specific meanings for intelligent behaviors. For example, the following comments were made about black humor in an article written by Saloy:

. . . Whoopi Goldberg, Moms Mabley, and a host of other black comedians are accomplished comedians as a result of a culture whose humor rose out of a bitter, often harsh and dangerous racial climate; the result is the common adage that

Blacks laughed to keep from crying, giving fuel to Langston Hughes' admonition that laughter is the "best medicine."

<b>Habits of Mind</b>	<b>Definitions</b>	<b>Events</b>
Persisting	They don't give up easily. They are able to analyze a problem, to develop a system, structure, or strategy to attack a problem.	Students often give up in despair when the answer to a problem is not immediately known.
Managing impulsivity	Effective problem solvers have a sense of deliberativeness: They think before they act.	Often students blurt the first answer that comes to mind. Sometimes they start to work without fully understanding the directions.
Listening to others with empathy	Some psychologists believe that the ability to listen to, empathize with, and understand another person's point of view is one of the highest forms of intelligent behavior.	We automatically judge, forming opinions and prejudices instead of really listening to others. We only want to entertain our own thoughts.
Thinking flexibly	Flexible people are the ones with the most control. They have the capacity to change their minds as they receive additional data.	Some students have difficulty in considering alternative points of view or dealing with more than one classification system simultaneously. THEIR way to solve a problem seems to be the ONLY way.
Thinking about thinking (Metacognition)	Metacognition is our ability to know what we know and what we don't know. It is our ability to plan a strategy for producing what information is needed.	This inner awareness and the strategy of recovery are components of metacognition.
Solving for accuracy and precision	People who value accuracy, precision and craftsmanship take time to check over their products.	Some students may turn in sloppy, incomplete, or uncorrected work. They are more anxious to get rid of the assignment than to check it over for accuracy and precision.
Questioning and posing problems	Effective problem solvers know how to ask questions to fill in the gaps between what they know and what they don't know.	They may pose simple questions intending to derive maximal results. When confronted with a discrepancy, they may lack an overall

		strategy of search and solution finding.
Applying past knowledge to new situations	Intelligent human beings learn from experience. When confronted with a new and perplexing problem they will often draw forth experience from their past.	Too often students begin each new task as if it were being approached for the very first time. Teachers are often dismayed when they invite students to recall how they solved a similar problem previously and students don't remember.
Thinking and communicating with clarity and precision	Language refinement plays a critical role in enhancing a person's cognitive maps, and their ability to think critically, which is the knowledge base for efficacious action.	We sometimes hear students and other adults using vague and imprecise language. They describe objects or events with words like <i>weird</i> , <i>nice</i> , or <i>OK</i> . Students use descriptive words as <i>stuff</i> , <i>junk</i> and <i>things</i> .
Gathering data through all senses	Intelligent people know that all information gets into the brain through the sensory pathways: gustatory, olfactory, tactile, kinesthetic, auditory, and visual. Most linguistic, cultural, and physical learning is derived from the environment by observing or taking in through the senses.	Some students operate within a narrow range of sensory problem solving strategies, wanting only to “describe it but not illustrate or act it,” or to “listen but not participate.”
Creating, imagining or innovating	All human beings have the capacity to generate novel, original, clever or ingenious products, solutions, and techniques—if that capacity is developed.	Students, however, are often heard saying, “I can't draw,” “I was never very good at art,” “I can't sing a note,” “I'm not creative.” Some people believe creative humans are just born that way or that creativity is in their genes and chromosomes.
Responding with wonderment and awe	Efficacious people have not only an “I CAN” attitude, but also an “I ENJOY” feeling. They seek problems to solve for themselves and to submit to others.	We want our students, however, to be curious, to commune with the world around them, to reflect on the changing formations of a cloud, to feel charmed by the opening of a bud, to sense the logical simplicity of

		mathematical order.
Taking responsible risks	Flexible people seem to have an almost uncontrollable urge to go beyond established limits. They are uneasy about comfort; they “live on the edge of their competence.”	Some students seem reluctant to take risks. Some students hold back from games, new learning, and new friendships because their fear of failure is far greater than their experience of venture or adventure.
Finding humor	Laughter transcends all human beings. Its’ positive effects on psychological functions include a drop in the pulse rate, the secretion of endorphins, an increased oxygen in the blood. It has been found to liberate creativity and provoke such higher level thinking skills as anticipation and finding novel relationships.	Some students find humor in all the “wrong” places— human differences, ineptitude, injurious behavior, vulgarity, violence, and profanity. They laugh at others, yet are unable to laugh at themselves.
Thinking Interdependently	Cooperative humans realize that all of us together are more powerful, intellectually and/or physically, than any one individual.	Some students may not have learned to work in groups: they have underdeveloped social skills. They feel isolated and prefer their solitude. “Leave me alone--I'll do it by myself.” “They just don't like me.” “I want to be alone.”
Learning continuously	Intelligent people are in a continuous learning mode. Their confidence, in combination with their inquisitiveness, allows them to constantly search for new and better ways. Intelligent people are always striving for improvement.	From an early age, employing a curriculum of fragmentation, competition, and reactivity, students are trained to believe that deep learning means figuring out the truth. Students have been taught give answers rather than to inquire.

### **LEVEL THREE: INTRODUCE INTERACTIVE WRITING**

Interactive writing is the source for developing stories that have a number of built-in adventures depending on the choices readers make throughout the adventure. These stories are very popular in the game development industry because they come in a format

that makes the story easy to program. There is a mathematical art form that interactive writers use for developing adventure stories.

### **Choose Your Own Adventure**

The story format in *Choose Your Own Adventure* books is written in second person. Therefore, students can name themselves as the main character, and furthermore include their own cultural experiences in the stories. This type of writing experience can help students have a realistic experience with the overarching theme of this unit: women overcoming obstacles. Interactive writing projects encourage students “to name themselves as readers, writers, and learners and supports them in the achievement of better reading, idea development, sense of audience, classifying, organizing, collaborating, representing understandings, revising, and articulating and applying critical standards about the quality of their work” (Wilhelm and Friedemann 15). These books are used so that students can begin with a simple model that demonstrates the most basic of interactive stories. The stories are easy to read and allow the student to continue making decisions throughout the course of the book. Let’s say the reader stumbles across a story choice on page 50. If he or she chooses option A, the reader must turn to page 100. If the choice is option B, the reader turns to page 25. The story progresses from there until it reaches its end. The adventure game stories usually start with one beginning and branch to many endings (Lewinski 45). The interactive writing concept leads the students to the mathematics involved in creating game stories. Since my unit’s primary focus is multicultural women writers, overcoming obstacles and healing, students will create stories that use multiethnic characters who have to make “intelligent” choices in a story, and those choices will enable the students to survive, heal, overcome obstacles, and find their identities. There is a student’s example of a game story where Harriet Tubman is used as the main character; then, fictional choices are added to show how a story can be written as an interactive game story (See Appendix A). This example uses a template found online with all of the steps (Schulze, *Read, Write, Think*).

### **LEVEL FOUR: MATHEMATICS AND MULTICULTURAL GAME STORIES**

Women and girl characters in games are rare. The women characters found in most games project sexist and stereotypical themes. Eric Adams, the producer of *D’Arce*, responds to why black game characters are portrayed only in urban environments:

I think critics are reaching for material to stir up trouble. The fact is that a large percentage of US African-Americans live in major urban environments. *D’Arce* is the first African-American computer game heroine. The game takes place in a major southern city because the location affords unique game play elements (like a baseball park, the docks, commerce center). It is a much more engrossing setting than say a sleepy Southern town of 1,000. Gun battles in a cotton field or a swamp are not that exciting (Womengamers).

## **Mathematics for Writing the Multicultural Game Story**

After the main characters have been chosen and the setting and genre of the game are established, the game writing process will begin with the construction of a story map. A story map is a flow diagram that shows the branches of the stories. The students will construct number sequences in an Excel spreadsheet for their stories. We will use a set of teacher-made templates like the example, “Harriet Tubman Adventures” (See Appendix A).

Interactive story maps are created using flow diagrams that contain decision symbols, processes, and branches so that the writer can write in an interactive style. These maps are sometimes called decision trees. Professional game writers usually create Adventure Game Authoring systems. For this unit, students will use primarily the Microsoft® Office products: Word, Excel, and Powerpoint. Content mastery students will create an adventure book that requires the use of manipulatives like index cards, markers, construction paper, and a flip chart (Diehn).

The flow diagrams will be developed using Microsoft® Word Flowchart symbols. The number sequences will be developed in Microsoft® Excel. Presentations of the material will be conducted using PowerPoint®. Students will use an online graphic organizer with instructions included (Schulze).

### **LESSON PLANS**

These lesson plans will provide students with a foundation in writing interactive stories that will explore the battles women fight as they search for identity. The central motivation of these lessons is the opportunity for student game stories.

#### **Primary Audience**

Middle school mathematics students and high school mathematics students

#### **Titles**

- I. Finding Common Themes in Literature Written by Multicultural Women Writers
- II. Defining Culturally Specific Intelligent Behaviors
- III. Using mathematics to Write an Adventure Story

#### **Lesson Plan I**

**Primary Audience:** middle school and high school mathematics students

**Lesson Title:** Finding Common Themes in Literature Written by Multicultural Women Writers

This plan is for establishing the themes found in literature written by multicultural women writers. Students will listen to an audio version of *Mama Day* and discuss the themes of overcoming obstacles, healing, survival, relationships, and spirituality.

**Estimated Time:** 5 days

**Required Materials:** copies of essays and excerpts from *Mama Day*, Sandra Cisneros, Ana Castillo, audio version of *Mama Day*, copies of “Where I’m From” examples, LCD projector, flip charts; mathematical literature: Caryn Navy, Elma Gonzales, Shirley Mathis McBay, and Nancy Wallace; Excel software on LCD projector.

**Objectives:** The students will:

- Create a themes matrix to use for collecting data about the characters in the literature.
- Analyze their own identity and culture and write an identity poem, “Where I’m From” or “My Name.”
- List the common themes found in mathematics literature by women and do a comparison using a Venn diagram.
- Record specific pages from the literature that relate to the themes.
- Participate in verbal discussions about the habits of mind that these women practice to overcome obstacles.
- List their favorite games and write how they were designed.
- Create a group and individual writing journal to use for all of the lessons

**Prerequisites:** literature that supports teaching writing in the classroom.

**Teaching the Lesson:**

- **Day 1:** Add the following terms to a spreadsheet and call it the “Themes Matrix:” Battles, Identity, Navigate Relationships, Embrace Changes in Society, Overcoming Obstacles, Psychological Healing, Spiritual Healing, Physical Healing, Wounded Emotionally, Troubled. Sources of Healing: Medical Doctors, Therapists, Shamans, Curanderas, Conjurers, Root Workers, and Clergy. Say to the students that these are some of the terms that we will begin to discuss in order to become familiar with common themes in the literature review. Pass out essays and excerpts from *Mama Day* and ask the students to highlight any terms they see that may be on this list or can be added to this list. Pass out blank copies of an Excel spreadsheet and ask the students to tally the number of times they see the terms in the literature they are reviewing. Use Excel to chart the findings, and have the students draw their charts on the spreadsheet.

- **Day 2:** Listen to Audio clips of *Mama Day* and discuss what is happening to the characters in the story. Identity exercise: “Where I’m From” and “My Name.” Read some examples of the poems and let students write their own. Display these on a bulletin board.
- **Day 3:** Compare and Contrast: Pass out copies of Caryn Navy, mathematician and Computer Scientist and reviews of Castillo’s *Peel My Love Like an Onion*. Use a Venn Diagram on the flipchart for similarities and differences that the students find in both of the women’s lives. Pass out “Beacon Hill” by Brown-Guillory, and *Engineer from the Comanche Nation* by Nancy Wallace. Draw a Venn Diagram and write down the similarities and differences that students find in the story.
- **Day 4:** Have students write about their favorite computer games; for those who do not have a favorite computer game, ask them to make up one to write about. The purpose of this lesson is to see how students already identify with characters in the games they play. Ask students to refer to the “themes matrix” and write a short story about their favorite game character using the “themes matrix” and the “Habits of Mind” model.
- **Day 5:** Computer lab activities: Students will create a community survey that discusses obstacles and healing. Over the weekend they will collect the data as a homework assignment. Finish *Mama Day* audio.

## **Lesson Plan II**

### ***Primary Audience***

Middle school and high school mathematics students

### ***Lesson Title:*** Defining Culturally Specific Intelligent Behaviors

This plan will address character attributes using the “Habits of Mind” model. Students will begin to develop their own lists for intelligent behaviors as tools for survival, overcoming obstacles. Students are encouraged to use real-life experiences about themselves or someone in their families.

***Estimated Time:*** 5 days

***Required Materials:*** Copies of the themes matrix, a LCD projector, and “Word Splash” activity installed. Word Splash is on page 16 of “*Activating and Engaging: Habits of Mind*” by Costa and Kallick. Student white boards and dry erase markers, index cards, chalkboard, flipchart, thinking maps, PowerPoint. “Habits of Mind” definitions and examples.



**Objectives:** The students will:

- Use an intelligence model for character development.
- Identify and define intelligent behaviors that help women overcome obstacles.
- State whether intelligent behaviors are related to the way women heal.
- Discuss whether or not there is a difference in the obstacles that men face when compared to women.
- Create their own intelligent behaviors that a woman would need in a game story in order to survive and win her battles.
- Share synonyms that match the habits of mind
- Enter examples of culturally specific intelligent behaviors into PowerPoint slides, using graphics to explain them.
- Demonstrate intelligent behaviors that they've observed in multicultural women.

**Prerequisites:** Familiarity with “Habits of Mind” and completed activities in Lesson Plan One.

**Teaching the Lesson:**

- **Day 1:** We begin this lesson by passing out copies of the “Habits of Mind”. Students will be asked to take out their surveys on obstacles (weekend homework assignment). Have students read the HOM (“Habits of Mind”) model quietly, and tell them that everyone will hear their thinking out loud later. After perhaps 15 minutes, open the lesson up for discussion and ask the students what habits of mind they found in the women stories they read about last week. To build fluency with the HOM terms and phrases, do a word splash activity. The activity begins with students writing down or saying words that mean the same thing as other words (synonyms). Students in this unit are asked to think of phrases that may match the terms. For example, *persisting* may mean the same thing as *stick to it* or *never give up*. Students will be reminded to think about the stories of Caryn Navy, who persisted even after she became blind at age ten and started her own Raised Dot Computer company, and Carmen, in *Peel My Love Like an Onion*, who was a great dancer and became crippled by polio, but still kept trying to dance. Write all of the student responses on the flip chart and post them somewhere in the room.
- **Day 2:** Discuss the definition of humor. Ask students how can humor be an intelligent behavior. Ask if there are differences between black, Hispanic, Native American and white humor, and if so, what makes them different. Ask the students about multicultural women who may use humor to overcome obstacles or find humor to be healing. Pass copies of *Still Laughing to Keep from Crying: Black Humor*, by Soloy, to the students. Homework assignment: students are to write as many culturally specific intelligent behaviors they can think of that are similar to those in the HOM model.

- **Day 3:** Discuss the intelligent lists (homework) with the class. Start to classify the differences based on culture and gender. Remind students that they will be writing their own stories about multicultural women in a game style.
- **Day 4:** Students will get into groups, choose one to three habits of mind, write a short five- to ten-minute script, and perform it for the class. The script must include a woman, and there must be a theme from their theme matrix.
- **Day 5:** Read David Auburn's play, *Proof*. Identify the obstacles that the main character, Catherine, had to overcome, and discuss the intelligent behaviors that she used in the story.

### **Lesson Plan III**

**Primary Audience:** middle school high school mathematics students

**Lesson Title:** Using Mathematics to Write an Adventure Story

Students will be divided into groups of four students. Each group will select a *Choose Your Own Adventure* book to read and analyze. Groups will then plan their own *Choose Your Own Adventure* story and present it to the class with the story maps.

**Estimated Time:** 5 days

**Required Materials:** Copies of Tomb Raider and Urban Chaos games. LCD projector and laptop to play the games. Different colored stickies, Visio Software installed on laptop, pencils, tape, markers, flipchart paper, rulers, Excel software installed on laptop. Copies of flowcharts, construction paper, scissors, and paper clips, themes matrix, list of intelligent behaviors.

**Objectives:** The students will:

- Read and analyze interactive fiction design in stories.
- Design story maps using flow charts.
- Review games with women characters and list themes and obstacles.
- Write adventure game stories about multicultural women overcoming obstacles.

**Prerequisites:** The students have:

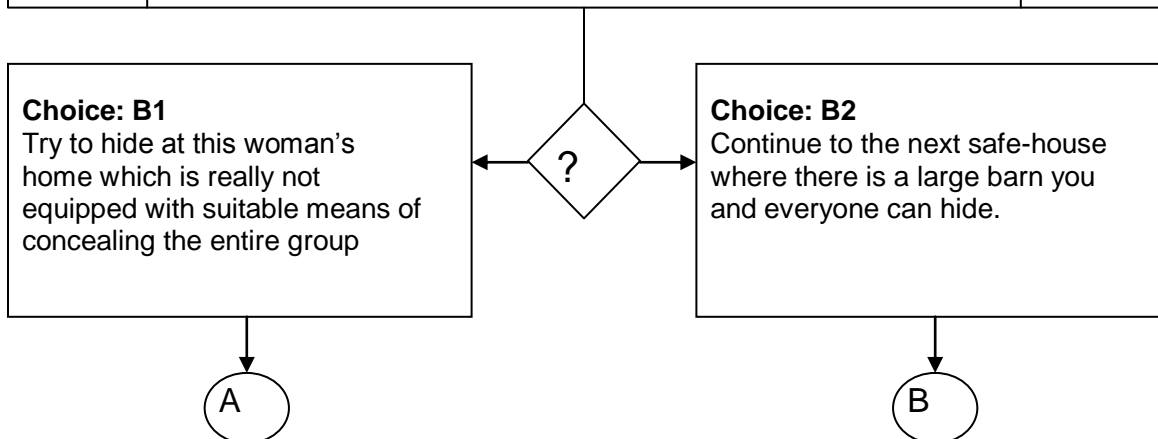
- Identified themes found in multicultural women's literature.
- Become familiar with HOM.
- Completed activities in Lesson Plan I.
- Completed activities in Lesson Plan II.

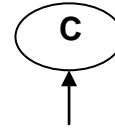
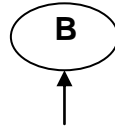
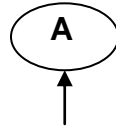
***Teaching the Lesson:***

- **Day 1:** Install Tomb Raider and Urban Chaos games on PCs in lab or library, (or in some place where students can review the games). These two games are selected because they include a woman as lead character. Groups will choose a book and, in the course of time, read and discuss it in their group. Students are instructed to analyze their book in terms of setting, characters, plot structure(s), theme, and point of view. Students should be in groups of four to brainstorm ideas for their *Choose Your Own Adventure* story.
- **Day 2:** All four students will participate in writing the first part of the story, which will contain the character and the setting, or module, after the group has established setting, themes, characters, exposition, and narrative hook. (See Appendix A for story map example.) This should then divide into two paths. The group can now split into two two-person groups to write the next module, including narrative hook through rising action to next conflict (two more paths). A hook is defined as something in the story that keeps the reader anxious to find out what will happen next.
- **Day 3:** Students should start drawing the story maps that match the story, edit, and revise. They should choose a number sequence for all of their story parts. For example, students may want to have the beginning scenario be 00000 and option 011000 (for level 1, option 1), so that option 2 at level 1 would be 012000. Once the students have their number sequences, send them to the computer lab to enter the data into Excel. This will help them when they are ready to rearrange how the reader will branch in the story.
- **Day 4:** We will then draw illustrations to match our stories, and the groups will be required to share the stories with other groups. We will use the rubrics located near the end of this curriculum to evaluate the groups' work.
- **Day 5:** Students will work on a display for all of their work using display boards, notes, PowerPoint, pictures, and the books that they created to show to friends, parents and other community members.

## APPENDIX

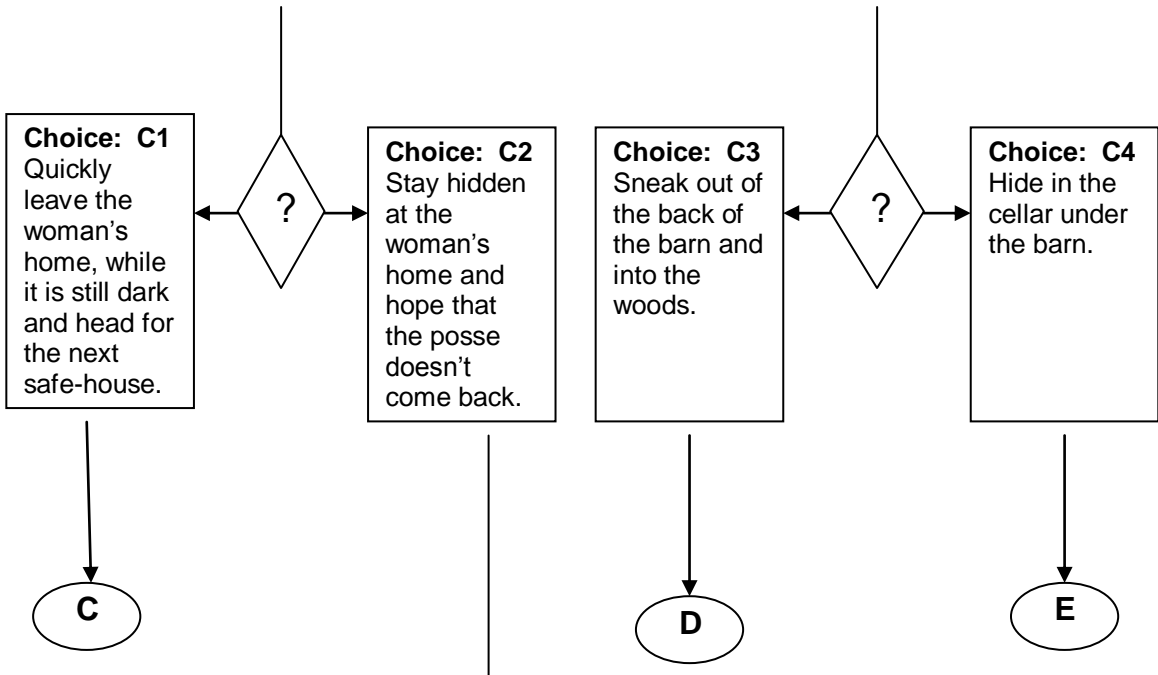
	<b>THE HARRIET TUBMAN ADVENTURE</b> <b>by Samantha Beasley</b>	
<p>You are Harriet Tubman and in 1849, you have escaped from slavery, in Maryland, to Pennsylvania. A year later, Congress passed the “Fugitive Slave Act” which demanded that if an escaped slave was sighted, he or she should be apprehended and turned in to the authorities for deportation back to the “rightful” owner down south. This made you an escaped fugitive. Because of this new law, the first organized resistance to slave owners was started and became known as the “Underground Railroad”. What the Underground Railroad did was help escaped slaves make their way from the slave-owning southern states up through the northern states and eventually into Canada and freedom. In 1851, You joined the “Underground Railroad” as a “conductor”. This was someone who aided the fugitive slaves on their journey to Canada and freedom. Other components of the “railroad” were stopping places or safe-houses, known as “stations”. You had many obstacles to face, like the weather, the sicknesses, and getting past people looking for you.” The fugitive slaves were known as “packages” or “freight”. It is a Saturday evening, in Maryland and You are awaiting the arrival of the “packages” which will be transported to Canada. You picked Saturday night because the Sabbath will certainly delay the slaves being missed. You have a loaded rifle, which you will use to threaten pro-slavery people that you may encounter, or also slaves, who may decide to back out of the journey. Fortunately, so far, you haven’t had to use it on either group. Everyone has arrived and it is time to get started. Your first stop is a place called Bucktown, at a white woman’s home. She will give us instructions. You met this woman on your first journey north. You arrive in Bucktown and the woman informs you that someone has already tipped off the slave-owners and they are in hot pursuit. You have to decide what to do.</p>		





**Decision: B1**  
 You decide to hide at the woman's house hoping that the slave-owner posse will get ahead of you. Everyone hides in closets and under the beds. Later the posse arrives at the woman's home asking if she has seen a group of slaves passing by. The woman denies encountering any slaves and the posse moves on. However, I know it is only a matter of time before the posse realizes that they have to be ahead of us since they are on horseback and we are on foot. At that point they will turn around and may come back and demand to search the woman's home

**Decision: B2**  
 You decide to continue on under the cover of darkness to get to the next safe-house before daylight. You can hear the posse in the distance so you keep the group very quiet. One of the slaves has brought her baby but since you had her sedate the baby at the very beginning of the trip, the baby is sound asleep. You all arrive at the safe-house just before daybreak and go into the barn. Within minutes, the posse arrives.



**Decision C2:**  
 You stayed hidden and the posse returned. They insisted on searching the woman's home. You were able to slip out undetected but the others were caught and taken back to their plantations. The woman received a fine for helping you. You will re-group for my next mission.

\*\*\*\*\*THE END\*\*\*\*\*

**D**

**Decision: C3**

You slipped out of the barn by a back door and hid in the woods. You heard the men enter the barn and begin searching and moving things around. They discovered the rear entrance and you saw them emerge from the barn. They looked around and then entered the wooded area. Everyone was frozen with fear. One member of the posse spotted a slave and hollered for the others to come and help. They soon rounded up all of the slaves and loaded them in a wagon. You were able to stay hidden until they left. You stayed on at this safe-house and began to plan your next mission.

\*\*\*\*\***THE END**\*\*\*\*\*

**E**

**Decision: C4**

The owners of this safe-house had dug a tunnel from underneath their barn to well inside the wooded area. Everyone entered the tunnel through a trap door in one of the horse stalls. You could hear the men of the posse enter the barn and start searching for you. They checked each of the stalls and even walked overhead of you and the others on the trap door. Everyone all remained deathly silent and still. It seemed to take forever for the men to leave. You all remained in the tunnel until it got dark that night then followed it into the wooded area. You and the others traveled for several hours to the next destination where you were instructed to follow the river to the next stop. As you traveled on, you all were hidden on a Quaker farm, in a haystack on a farm belonging to German immigrants, and for a week in a potato hole in a cabin belonging to free blacks. All of you eventually completed your long journey by crossing a train trestle into Canada. The group of slaves was overjoyed and began chanting "Free at last!" You got them to a shelter where they were given assistance to begin their new life in freedom.

\*\*\*\*\***THE END**\*\*\*\*\*

**Teacher and Student Rubrics**

*Student Evaluation*

Name: \_\_\_\_\_ Game Name \_\_\_\_\_

Date: \_\_\_\_\_ Setting \_\_\_\_\_

How well did I follow directions? 1 2 3 4 5

How well is my display organized? 1 2 3 4 5

How well is my display written and designed? 1 2 3 4 5

How creative is my display? 1 2 3 4 5

How would I grade my total display? 1 2 3 4 5

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*Teacher Evaluation*

Name: \_\_\_\_\_ Game Name: \_\_\_\_\_

Date: \_\_\_\_\_ Settings: \_\_\_\_\_

How well did the student follow directions? 1 2 3 4 5

How well did the student organize the display? 1 2 3 4 5

How well did the student write and design it? 1 2 3 4 5

How creative is the display? 1 2 3 4 5

**What is the overall grade for this project? 1 2 3 4 5**

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This is a play that deals with mathematical concepts, and the main character is a girl who struggles to overcome the obstacles of inheriting her father's math genius. She has to deal with not being the "boy" mathematician.

Brown-Guillory, Elizabeth. *Louisiana Literature: A Review of Literature and the Humanities*. 2003. Louisiana Literature. June 2003. <<http://www.selu.edu/orgs/lalit/brown.html>>.

This is an excellent story about a girl named Brandy and her great grandmother Tauntzia. The girl stays with her grandmother, but with great resistance, yet finds a greater purpose for her visit.

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The book suggests strategies for developing small learning communities.

Buckles, Mary Ann. "Interactive Fiction: The Computer Storygame 'Adventure'." Ph.D. Thesis. U. Cal at San Diego, 1985. June 2003. <<http://www.uwec.edu/jerzdg/orr/articles/IF/bibliography/academe.htm>>.

Burns, Marilyn. *Writing in Math Class? Absolutely!* Instructor: 104, April 1995: 36. I found the information on pages 40-47 in this book to be very helpful. The author, Burns, discusses how writing in a math class supports student learning because students have to organize their thinking order.

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Castillo's heroine in this story is Carmen La Coja who once was a great Flamenco dancer, but is crippled due to polio. Both characters from these two books show women overcoming obstacles.

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\_\_\_\_\_. *Welcome to the Habits of Mind Web site!* 2000. Arthur L. Costa and Bena Kallick. June 2003. <<http://www.habits-of-mind.net/>>.



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Wilhelm, J.D., P.D. Friedmann, and J. Erickson. *Hyperlearning: Where Projects, Inquiry, and Technology Meet*. York, Michigan: Stenhouse, 1998.

The authors discuss the benefits for teaching students to write using hypermedia and other forms of interactive writing.

Woolfe, Sue. *Leaning Towards Infinity*. Winchester, MA: Faber and Faber Co., Inc. 1997.

This is a mathematical fiction story that addresses the conflict of a mother and daughter who are both gifted mathematicians. How the daughter has to overcome the obstacles of feeling “distant” from her mother and her inability to communicate with her.

*WomenGamers.com Digital Women: An Inside Look at D’Arci of Urban Chaos*.

2001. WomenGamers.com. June 2003. <<http://www.womengamers.com>>.

Interview with Eric Adams who created the first black woman heroine game character in a game called Urban Chaos. He responds to criticisms that black game characters seem to be portrayed only in urban environments, reflecting a racist assumption.

## **Movies**

*Alien*. Directed by Ridley Scott. Twentieth Century Fox, 1979. (117 minutes)

This movie depicts a woman as a heroine. The movie is science fiction, and the main character has to battle an alien in order to live.

*Charlie’s Angels*. Directed by McG. Columbia Tristar, 2000. (98 mins)

This movie is an action movie that depicts three young women as action heroines.

*Lara Croft: Tomb Raider*. Directed by Simon West. Paramount, 2001. (100 mins)

This is the movie version of the game where the heroine fights criminals.

*Final Fantasy: The Spirits Within*. Directed by Hironobu Sakaguchi and Moto Sakakibara. Columbia Tristar, 2001(106 mins)

A movie of a woman heroine created in digital form.

## **Audio**

Gloria Naylor. *Mama Day* (unabridged). Brilliance Audio, 1991

An audio version of *Mama Day*

Destiny's Child. "Independent Woman," *Destiny's Child*. Sony Music: 2001

First track of this album talks about women being independent. I will discuss and get feedback from students about the lyrics.

## **Computer Software**

### *Visio Flow Charting*

This software is used to create flow diagrams with electronic grids and several pallets for drawing.

### *Tomb Raider*

This is a computer game that is also a theme of a woman heroine.

### *Urban Chaos*

A computer game whose main character is a black woman who is a heroine that solves crimes.

### *StoryWriter*

Software designed for writing various types of literature from plays to novels.

### *Zdnet Game Downloads*

This is a site located at <<http://www.zdnet.com/downloads>>. Students can download free games and review software used to create games using keyword searches.

### *Microsoft® Office*

Word, Excel, PowerPoint and Paintbrush