CONCEPT/VOCABULARY ANALYSIS

 Literary Text: The Number Devil by Hans Magnus Enzensberger

 Organizational Patterns
 This book tells the story of twelve year old Robert, a student a feed up with his math teacher who assigns too many word problems and bans the use of calculators. He has a series of dreams in which he meets and is tutored by The Number Devil. The novel contains 12 chapters each titled after the night in which that particular dream occurred: The First Night, The Second Night, etc. These chapters range from 14–21 pages and contain various graphs and pictures illustrating the story. While the mathematical concepts do not occur in any specific order the main development in the story takes place within Robert, who changes from being a math phobic to feeling confident in numerical situations.

 Issues Related to this Study of Literature

 Theme
 Math is do-able – The book focuses a lot on making fairly complex concepts understandable to even fairly young readers. Instead of using terms like square root, prime, irrational, imaginary, etc. the author uses simpler, sometimes humorous terms like rutabaga, prima donna numbers, impossible numbers, and imaginative numbers.

 Math Concepts should be simple and beautiful - This theme is introduced early in the book, in the first encounter between Robert and the Number Devil. “You never know when your battery will die on you. But mathematics, my boy, that’s something else again!” “But if talking about numbers is as simple as talking about movies or bikes, why do they need their own devil?” (14-15). They need a devil, it would seem, to make their simplicity visible.

 Math Can be Fun (sometimes) – In The Number Devil Enzensberger has brought the reader into a fun and fantasy filled world where math ceases to be a drudgery but instead becomes enjoyable. Comments made about his book range from five and seven year olds who cant wait to hear the next chapter to
middle school students who are beginning to enjoy their math assignments, to parents who feel they understand the concepts much better than ever before.

**SETTING**

The story takes place almost entirely in Robert’s dreams with only a small amount taking place in his house, classroom etc. while he is awake. The dreams take on a number of settings varying from trees to a beach to a strange town filled with copies of his math teacher to the palace in Number Heaven/Number Hell. Each of the settings serves to advance the mathematical purpose of the chapter.

**FORESHADOWING**

Some elements of fiction are not as strong in this book as they are in other novels and there is not much in the way of foreshadowing in this book. The only possible instance of this is that there are some hints that Robert will eventually come to like numbers.

**POINT OF VIEW, NARRATIVE VOICE**

The point of view in this story is a third person narrator who is very aware of Robert’s feelings and emotions, but does not give us much of a look into anyone else’s head. In fact all of what we hear from other characters is spoken while Robert is in the room with them. This is done so that we will identify with Robert and go with him as he begins his journey of “discovering mathematics”.

**TONE**

The tone is very light and somewhat playful and humorous. At the beginning of the book there is a detailed description of Robert’s dreams such as being eaten by a giant fish or sliding on a never ending slide. We also see less mature number devil who often gets mad or offended and leaves in a puff. Midway the tone shifts to one of reflection as Robert’s attitudes start to change and he begins to be intrigued by what he is learning. By the end there is a more mature, competent tone, laced with a spirit of fun. The tone of the book changes as its main to characters, Robert and the Number Devil, change from a squabble about respect and mutual distrust, to a distinguished ceremony, mutual friendship and personal achievement.

**IRONY**
It is ironic that although Robert starts off the student hating his dreams and math by the end of the story he is longing for both.

Robert also finds some confusion in the idea that Number Heaven is also called Number Hell. Though at the beginning of the story he surely would have found the second title more obvious, by the end it is the Number Devil who has to explain the reason for the second title to him.

### Affective Issues Related to the Work

**Math Phobia:** A high amount of students, particularly in the United States, suffer from high amounts of anxiety at the thought of having to deal with anything mathematically related. Many have had negative experiences in the past, some have bought into the false notions that only men are good at math, or that it is an aptitude that you are born with. In this novel the reader is shown, through Robert that ability in math is something that can be developed. Everyone has the potential to develop number devil status, and become an apprentice as Robert does at in the final chapter of the book. This book uses several parallels to help the reader see that there is nothing to be afraid of. First Roberts “nightmares” turn out to be rather engaging and he finds he enjoys talking with his new friend and even begins to anticipate the next lesson. Second, the Number Devil tells us, “Number Paradise, Number Hell, Number Heaven – it’s all the same in the end” (235). This is really a key point. Whether it’s heaven or hell in the end is really a matter of perspective.

**Good/bad math teachers:** Mr. Blockel is a classic bad math teacher. We have all had them, some of us more than once, sitting behind their desk reading papers, eating food, putting together puzzles, or doing any number of things besides actively taking an interest in their students. Some are worn out, some are incompetent, some are genius who can’t understand why anyone would struggle, some are coaches who had to be put in charge of some class and some just plain don’t care. No matter what the reason it most likely deserves a discussion because most students have festering resentments they just need to cut lose. Maybe it was that teacher who lost all their assignments, or the one who told them they just weren’t good enough, or the year they failed every test no matter how hard they tried. Maybe they have been told there is only one correct way of doing math and are missing
the beauty of it. No matter what their past experiences, having an opportunity to vent, and discuss positive solutions and what makes a good math teacher may benefit all of them and help them to start off with a clean slate (as well as help you know what they are expecting).

Math--The International Language: This can be addressed as a fun activity. In the last chapter of the book Robert attends a banquet for all the number devils. His invitation is signed in Arabic. At the banquet he watches people parade in. “There were solemn Egyptians, there were Indians with pink dots on their foreheads, there were Arabs wearing burnooses and monks in habits, there were Africans and American Indians, Turks with curved swords Americans in jeans. There were thousands of them” (244). One of the qualities of math that makes it so beautiful is that it can be understood by anyone all around the world. A fun class activity would be to find some copies of texts in other languages, preferably on topics being studies in class and give students some exercises to try. (These can be found at the library or online. Spanish texts are the easiest to find, there may even be a Spanish version of the text you are using.) Go through an example and ask the kids to figure out what is being done. Then let them work some on their own. Help them to see that they can understand what is happening, even from a text that is written in a foreign language. Another good activity is to have students research mathematical contributions from various countries and eras and share them with the class.

Vocabulary Issues

Because math is full of terminology vocabulary could have been a big issue with this book and would have made it inaccessible to many readers. To get around this potential problem the author uses “dream words” because “Technical terms don’t exist in dreams. Nobody dreams in big words” (254). For example he calls raising a number to a certain power “hopping” it. Thus a number that has been hopped twice is squared, hopped three times it is cubed. A square root he calls a rutabaga. Five factorial is five vroom, prime numbers are prima-donna numbers, imaginary numbers are called imaginative numbers and so on. Most other words used are at a grade school reading level. The only passage that may contain some new terms is the multicultural number devil description listed above, words like burnooses may need to be explained. Obviously a discussion of the technical terms is needed as part of tying the dream material into class discussions, no
mention of the technical names is made in the book except for a warning placed at the very end.

Background Knowledge
Some basic mathematical background knowledge is needed to understand this book. One mother said she had read it to her five and seven year old children and while they had enjoyed it they had not gotten much of the mathematical content. Luckily the way the book is written you do not need to understand everything to enjoy the text as a whole. I would say basic skills at least to a multiplication and division level are necessary to understand the majority of the topics. With that foundation you can understand squares and square roots and series and what is rational or irrational. Obviously the more background knowledge you have the more connections you can make. Some rather complex math is mentioned briefly such as imaginary numbers, which is good for catching a student’s interest, but it is not necessary for them to have more than a basic background in math to gain a lot from this book.

Gender Issues
This book does not deal with many issues other than math phobia, but it does briefly address the issue women feeling less successful in math. At the number devil banquet in the final chapter of the book Robert views a processional of famous “number devils” (mathematicians). “Robert was amazed at how many also how few women he saw more than six or seven, and no seriously.” He then questions his friend: “Why aren’t their more women? Is there a rule against them?” To which the number devil replies: “They used to have a hard time of it. Palace policy was clear: Mathematics is man’s work. But things seem to be changing of late.” Here, especially in a math class it would be worth pausing and discussing the reasons why there have been less female mathematicians, who those few might have been, and how and why that is changing today.

Implications for Students of Diversity
This has already been covered to some extent in the section on math as an international language. It may be beneficial for international students in the class to demonstrate some of the techniques or skills they have learned for approaching math problems, for example many countries have a different set up for solving long division problems. It might also be helpful to look at
The Central Question/Enduring Issue

The beauty and power of mathematics can be accessible to all types and ages: This, to me, is really the main, enduring issue of the book. So many people have limited their possibilities by avoiding math. I have a good friend who would have loved to be an architect but felt that math was not her thing. There are many stories like this one. If math could be made more accessible to children and adults there would be more success and less frustration in our schools. Books like this one need to be read and written and will play a key role in overcoming the so called “math phobia” that is so prevalent in our society today.

Research Issues/Project Ideas

In addition to the project ideas listed above students could research how math relates to occupations in which they are interested.

Students could be given the challenge to write their own math story or video clip. (Some good student video examples are listed below under Related texts, these can be found on Google video).

Related Texts:

*Flatland: A Romance of Many Dimensions*, By Edwin Abbott Abbott- This text is from 1844 and has many topics, both mathematical and social, that are suited for a high school classroom. It addresses ideas such as multiple dimensions which is good for abstract thinkers.

*Math Curse*, By Jon Scieszka and Lane Smith-This book is about a boy whose begins to see math problems in everything! It is full of pictures and problems for students to solve, with the answers on the back cover. Eventually he breaks the curse and discovers that math is a piece of cake, or better yet pie. 😊

*Lazy Man Math*- A series of stories developed for perspective elementary school teachers in Hawaii by E. Lee Lady. They cover a variety of topics from mental math using large numbers to solving polynomials. The main character for the stories is “The Lazy Man” who is always looking for new, easier methods. [http://www.math.hawaii.edu/~lee/elementary/](http://www.math.hawaii.edu/~lee/elementary/)
*Lord of the Math* (Student Video)- This is an entertaining clip mimicking the popular Lord of the Rings films, but with many references to mathematical concepts.

http://video.google.com/videoplay?docid=8669722561812354345&q=math

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