

# Crossing the Curricular Divide

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Just Read, Florida! 7th  
Annual Leadership  
Conference  
June 29 – July 2, 2008



“What if learning were interdisciplinary and not arbitrarily divided into forty-five minute chunks with teachers who rarely have time to speak to one another, let alone collaborate?” (Beers, 2007, p. 11)

# What Does it Mean to Integrate Curricular Areas?

- **Interdisciplinary teaching** means that learning takes place in all the disciplines, at the same time, on a common topic, subject, or theme.
- **Cross-curricular** teaching can be done infusing one or more disciplines within a single content area classroom.
- **Co-teaching, or shared teaching** can also provide an integrated classroom experience.

The term “interdisciplinary” has evolved over time...

- What are participant thoughts about what this means?

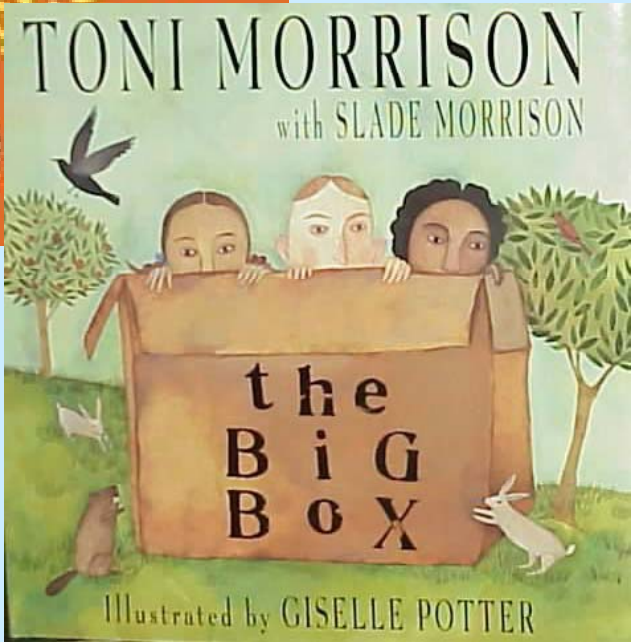
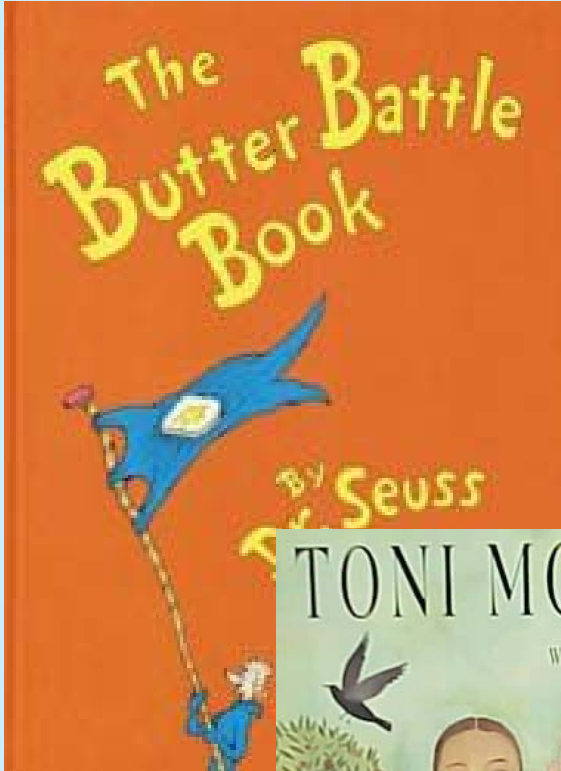
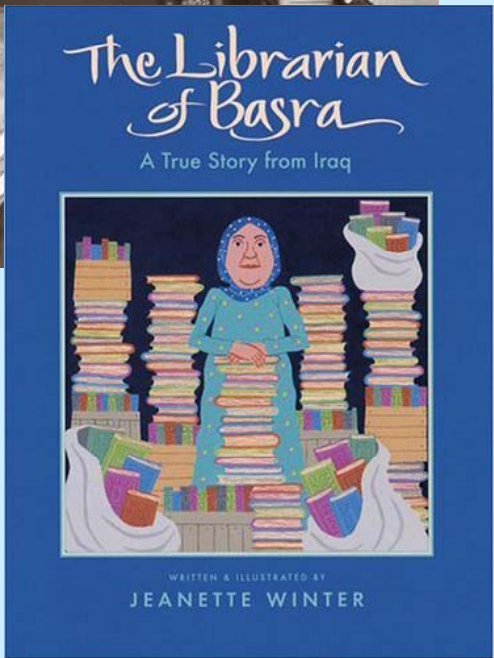
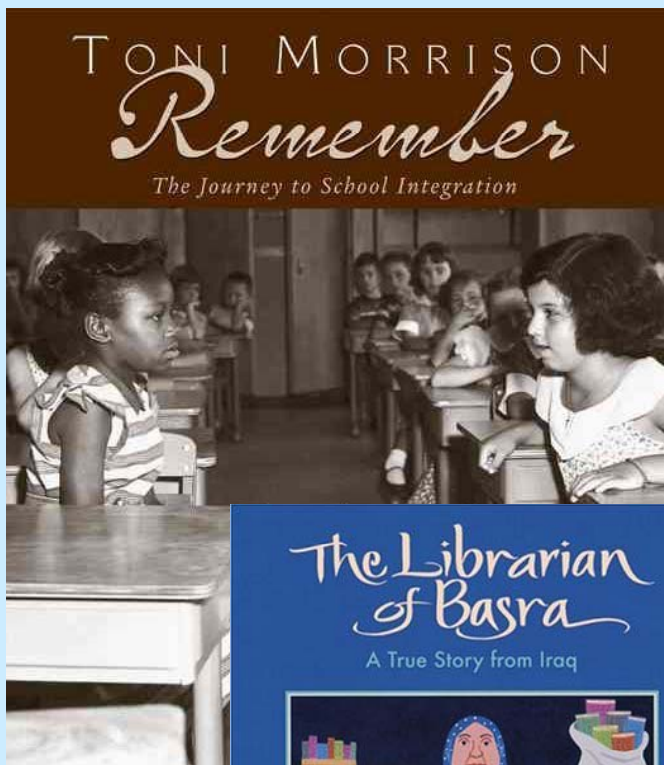


# Despite how we define these terms...

- Integrating curriculum (or crossing curricular boundaries) is simply a way to provide rigorous and relevant learning for all students
- It is a way for students to make real world connections to content and remove learning in isolation
- It is a way in which to promote life-long learning

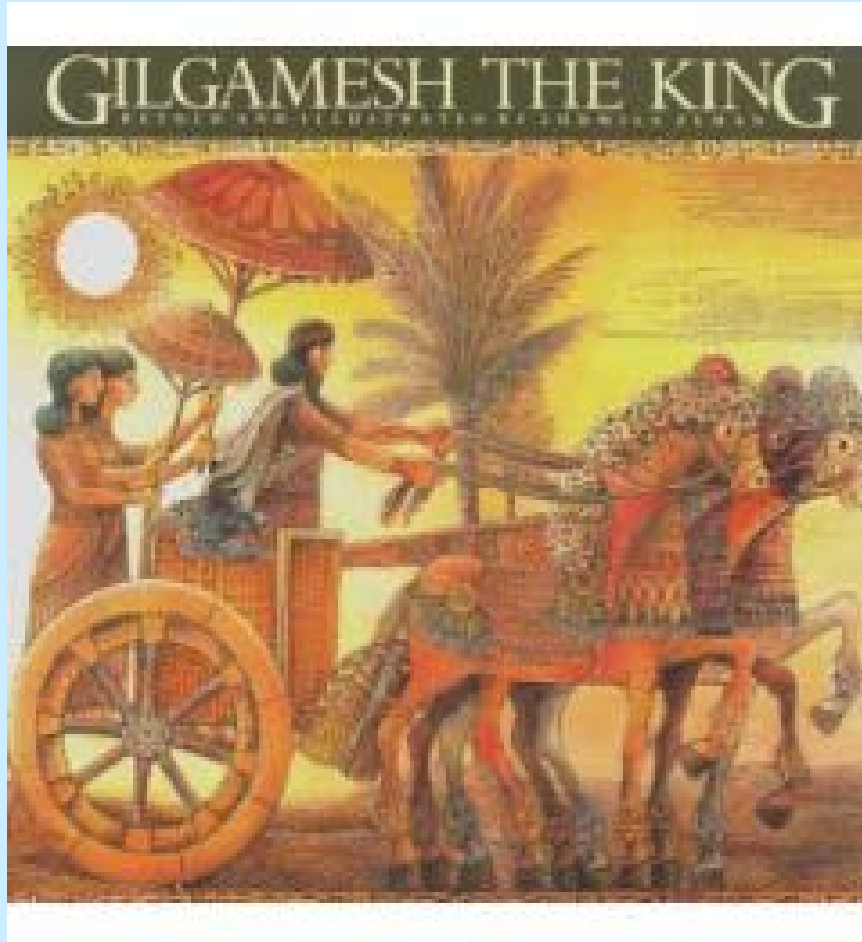
# Learning with Picture Books

- “Some of the most interesting, but often overlooked, books that can be used at all grade levels are picture books” (Vacca & Vacca (2002), p. 49).
- Readers construct meaning with a picture book in much the same way that they do with other types of texts: the readers’ purposes for reading, prior knowledge, attitudes, and conceptual abilities determine in large part what and how the readers comprehend” (Vacca & Vacca (2002), p. 50).
- “Picture books have been a prominent feature of elementary classrooms for decades...but elementary kids can’t have all the fun!” (Harvey & Goudvis (2000), p. 46).

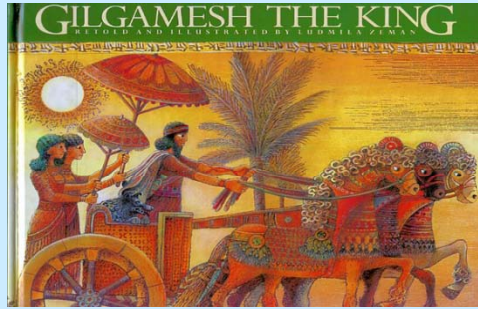


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# Pairing Social Studies & Reading



- See Handout 1
- Group Activity
  - Partial reading
  - Bringing in questioning to learn about the content
  - Visual response & Summarization (Handout 2)



**Visual Response:** Draw a picture below in response to Gilgamesh the King by Ludmila Zeman. Remember to give your picture a title.

**Summarization:** Write a short summary of what takes place in the short story. Remember to use complete sentences.

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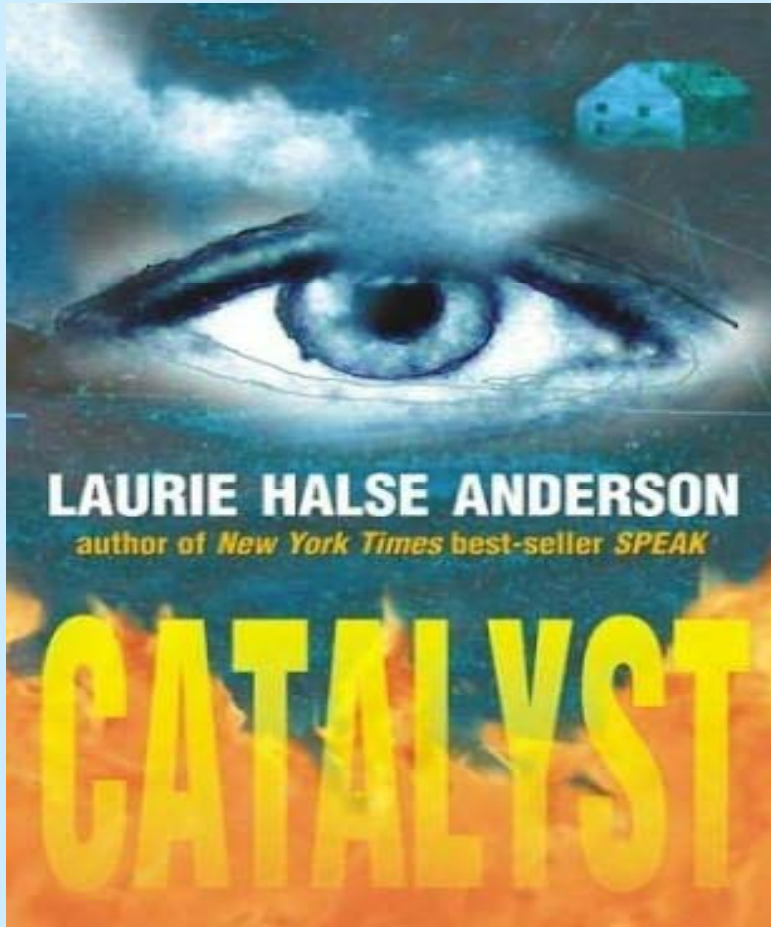
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# What other curricular connections can be made within this topic?

- Literature-The Epic of Gilgamesh
- Law Studies- *The Code of Hammurabi*
- World History-The characteristics of civilizations
- Art-cuneiform and other art forms of the Ancient Sumerians
- Science – inventions of Sumer and the archeology of the region

- “Literature provides the context for understanding the significance of facts.
- Literature enables students to transform knowledge into personally useful and meaningful tools for expanding the understanding of the world and themselves” (Runyan & Faircloth, 1995).

# Pairing Science and Reading



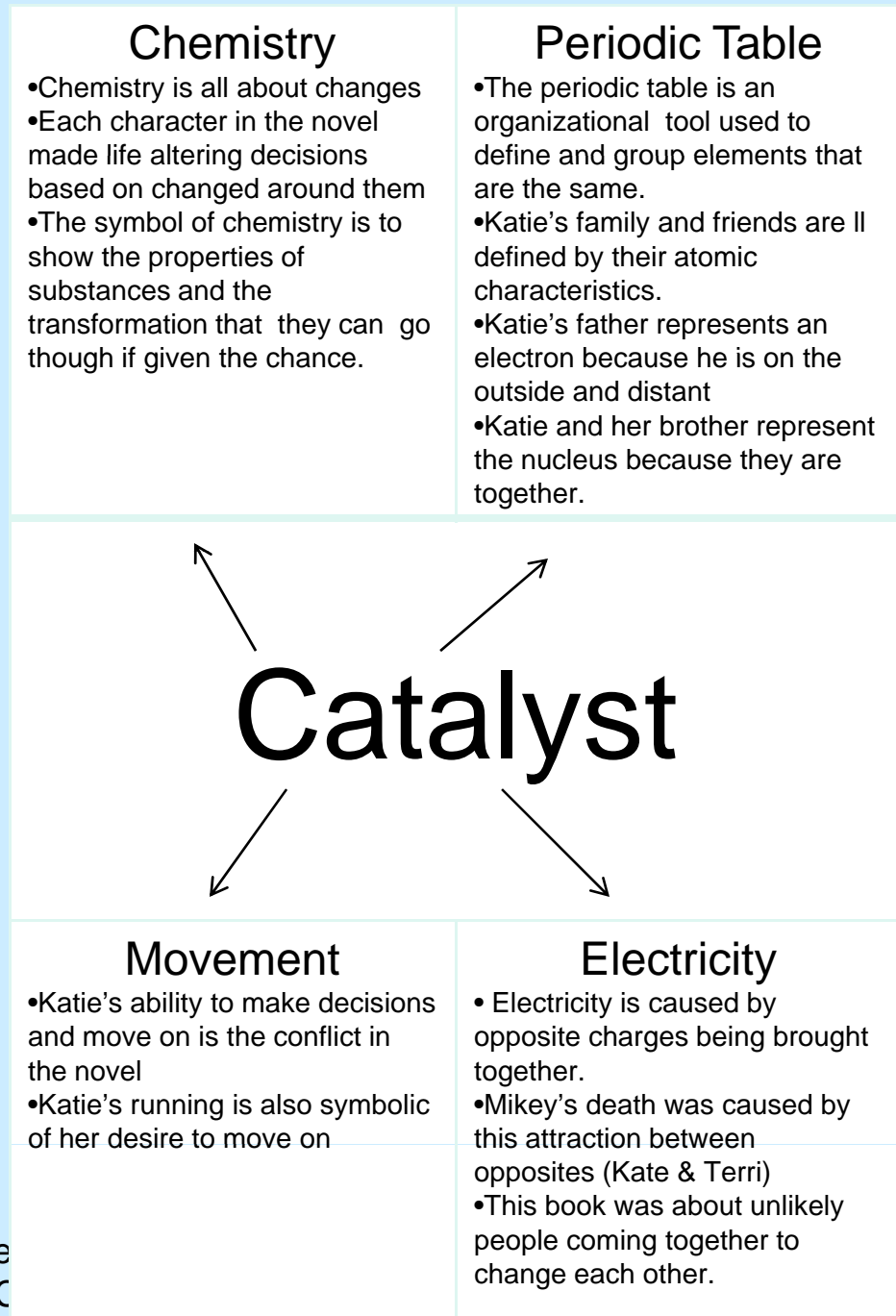
- Finding a connection between science and literature can be a difficult task
- Establishing a connection between scientific happenings and characters and events in a novel is an effective way to reinforce student learning.

# *A catalyst is...*

- Scientifically, a catalyst is a substance that speeds up a chemical reaction without being used or destroyed.
- Catalyst, by Laurie Halse Anderson provides a story line in which the characters are analogous to elements on the periodic table.

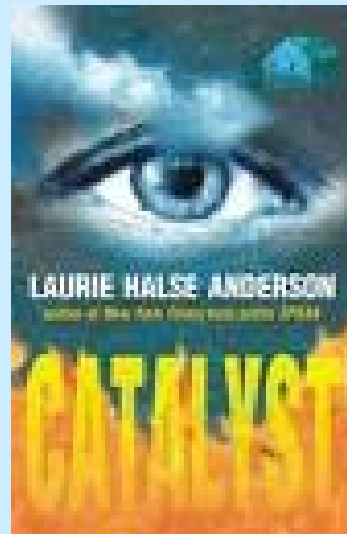
▪ This graphic organizer is an example of something students use during reading and during whole group discussions.

▪ As the students read they are to make connections between the characters in the novel and the four categories of science represented



Laurie Halse Anderson, “the author, went to a detailed level to mimic science”

(Allison Portwood, PCHS, Science Dept.)



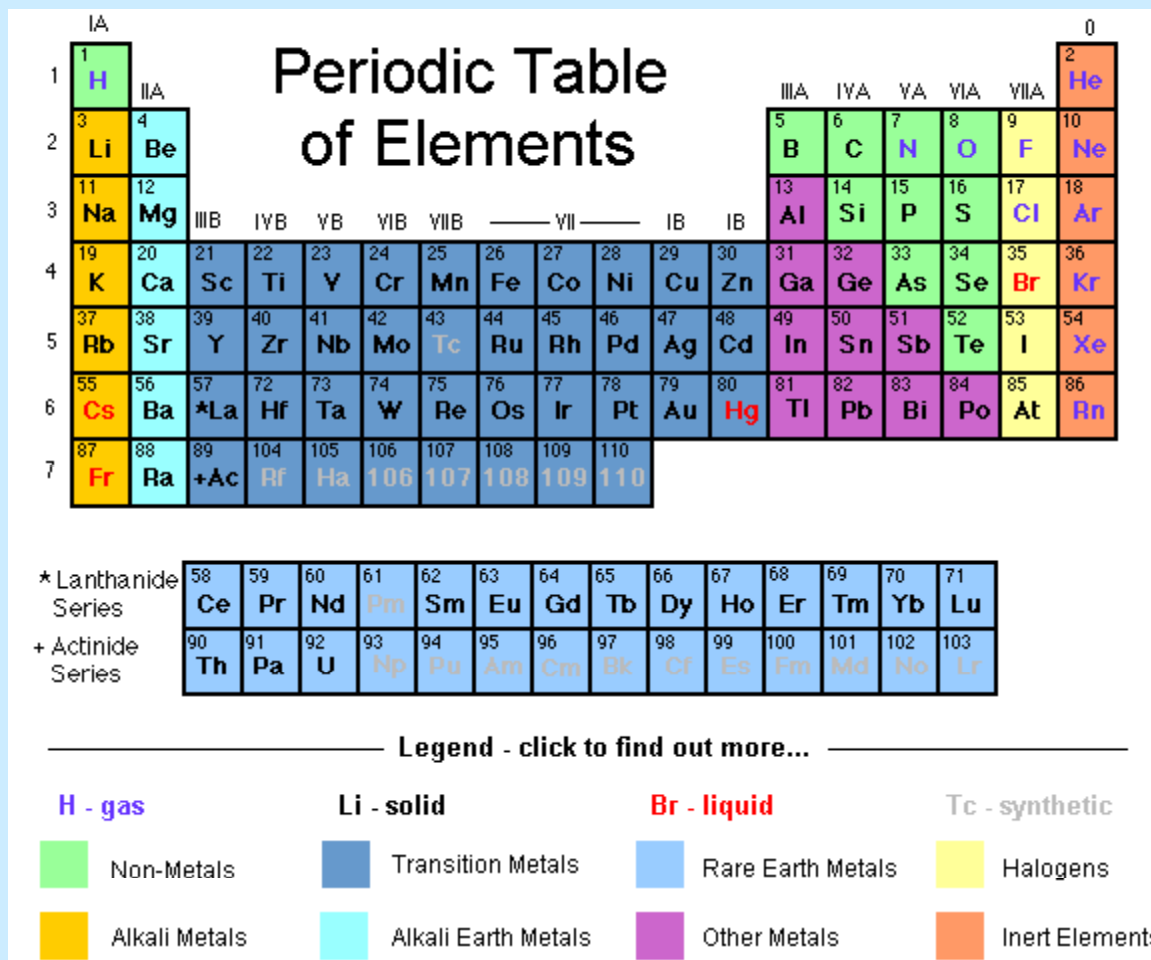
# What other ways can science be utilized in a cross-curricular way?

- *Periodic Poetry* – After reading Catalyst, students can write poetry about the different elements.
- Looking at inventions, disease, and scientific challenges and changes throughout the years. This can be historical, fictional, or a combination of both.

# Periodic Poetry

- Adopt an Element – Create and place on a cereal box – be creative!
- Complete a draft information sheet
  - Use a variety of resources. Science encyclopedias, catalogs, magazines and / or internet sites. Don't forget about your textbook. You must provide a list of your sources. At least three different types of source are required.
  - Create an advertisement for your element
  - The ad must include the element's name, symbol, atomic number, atomic mass, cost, and an advertising slogan that describes one or more of its important uses. Ads must be neat, colorful, and contain all information listed. Pictures may enhance your theme.

Graphics obtained on January 22, 2008 from <http://www.corrosionsource.com/handbook/periodic/>

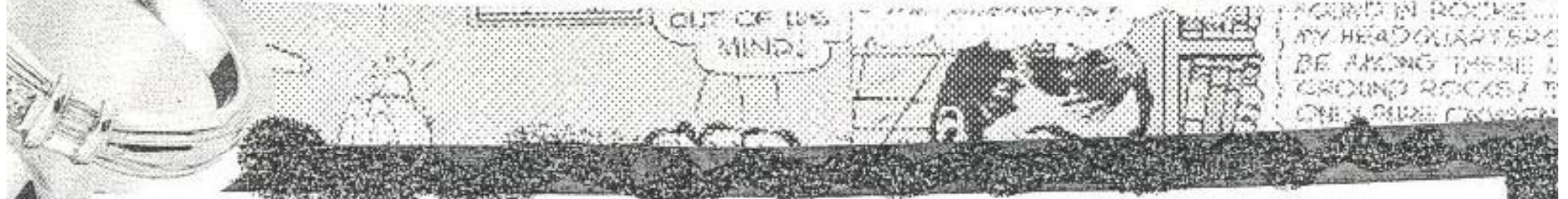


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CHEMICAL  
M. B. S. S. S.

# CANDIDOM

RECORDED AT THE  
TO MY OWN LIPS  
IS BASED ON  
MY ENGLER, SA  
MODEL OF A  
ELEMENTS

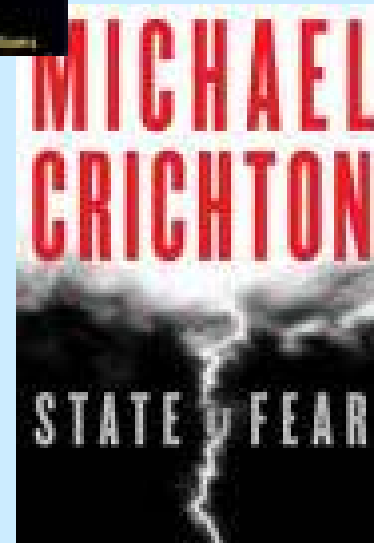
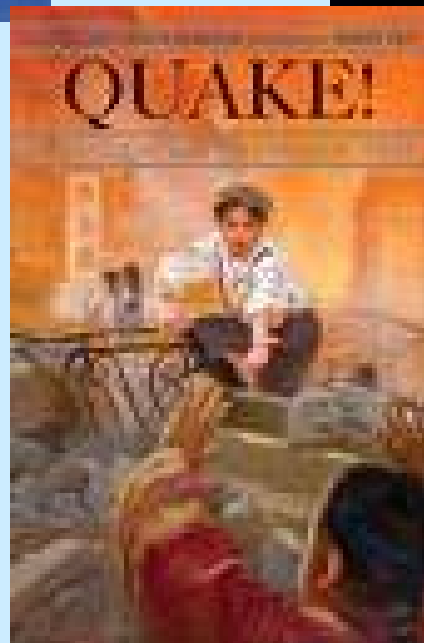
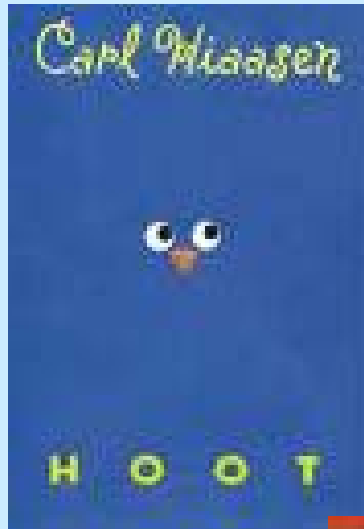


FOUND IN ROCKS...  
MY HEADQUARTERS  
BE AMONG THESE  
GROUND ROCKS  
ON A RUBY CRYSTAL

High pressure on coal for a thousand years  
Can turn carbon into diamonds for your fingers and ears.  
With additions of elements diamonds can be,  
Turned into other stones like the ruby.  
Graphite, too, is a different carbon in form,  
Found in pencils these days, lead caused too much harm.  
Not only is carbon found in these material things,  
But is the basis of life for all living beings.



I HAVE  
OR DONALD  
CHEMIST  
ERSE!  
THAT IS  
THE HEAD  
EVEN UNCA  
BRAIN FE

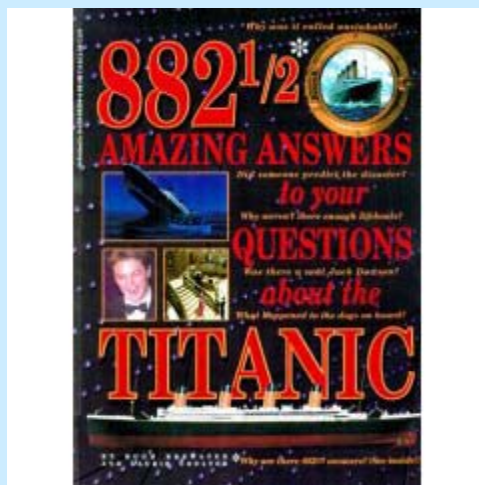


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While math & science seem a natural fit...math opens the door for literacy as well.

- One must be able to read the text to comprehend its content
- Math is NOT just manipulation of numbers
- It requires literacy to read and solve problems presented in math
- The content of math is often found in text unrelated to math

$$\frac{-2 \pm \sqrt{2^2 - 4(1)(1)}}{2(1)}$$
$$\frac{-2 \pm \sqrt{4 - 4}}{2}$$
$$\frac{-2 \pm \sqrt{0}}{2} \quad - \frac{-2}{2} \quad - \quad -1$$



**As early as 1967, Stern & Keislar stated, “ ...children who were taught strategies for solving math word problems were significantly more successful than children who had not been given such instruction...Their findings indicated that reflective students who reflected upon the quality of their answers achieved better scores than the impulsive subjects who gave unconsidered responses” (McNinch, G.H., Ed., 1982, p. 3).**

## Modified from A Teaching Unit for The Titanic @

<http://hermani1.tripod.com/titanicmathwk.htm> accessed Jan 21, 2008


- Titanic Math
- Modified from A Teaching Unit for the Titanic
- The Titanic set sail on its famous journey at 12:00 noon on April 10, 1912, from South Hampton, England with 1,324 passengers aboard. The first stop was Cherbourg, France. After picking up 274 passengers, the Titanic once again set sail at 8:10 pm toward Queenstown, Ireland. With a total of 2,227 people on board, this great vessel left Queenstown toward New York at 1:30pm on Thursday April 11, 1912.
- The Titanic sailed on Friday April 12 and Saturday April 13 in clear weather. On Sunday, April 14, at 11:40 pm, the Titanic struck an iceberg. At 12:00 am the captain was told that the Titanic would only stay afloat for a couple of hours. It was noted that Boat No. 7 had only 19 of 65 aboard. At 2:20am Monday April 15, 1912 the Titanic sank into the sea and with it many of its passengers.
- When the Titanic was equipped, the British Board of Trade Rules stated ships of 10,000 tons must carry at least 16 lifeboats. The rules did not keep up with industry and were never changed. The Titanic carried 20 lifeboats. Fourteen that held 65 passengers each, 2 were emergency cutters which held 40 people each and 4 were collapsible boards which held 47 people each.
  - ***Only 705 people survived the sinking of the Titanic. How many more people could have been saved if the lifeboats were filled to capacity and everyone survived until rescue?***
  - ***How many more lifeboats were needed to save all people aboard the Titanic?***

# Titanic Math Using SQRQCQ

- Strategic approach to word problems
- Survey
- Question
- Read
- Question
- Compute
- Question

## SQRQCQ

Survey, Question, Read, Question, Compute, Question  
A Strategic Math Strategy

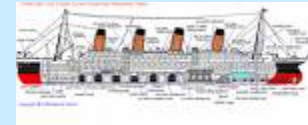
<p><b>SURVEY</b> Scan to understand nature of problem (read the questions) Clarify unknown terms</p>	<p>I read the questions and noticed the question is about the lifeboats, but there are lots of other figures there.</p> 
<p><b>QUESTION</b> What is the nature of the problem? Change to a question, draw a diagram, table or chart to help you visualize.</p>	<p>How many lifeboats were on the Titanic and how many did they hold? *Once I figure that out then I can subtract the number the possible passengers in the lifeboat and could hold and get an answer to how many more I'd need by subtracting.</p>
<p><b>READ</b> Read carefully. Highlight, circle, etc. the passage, look for details and relation-ships.</p>	<p>Fourteen boats held 65 passengers each,( one boat had only 19 people on it) 2 which held 40 people each and 4 held 47 people each.</p>
<p><b>QUESTION</b> What are the givens? What are the unknowns? Check units you are working in, what processes do you need?</p>	<p>Not all the boats were full, and even if they were that wouldn't hold everyone. I need to look for figures</p>
<p><b>COMPUTE</b> Calculate in a systematic manner</p>	<p><math>13 \times 65 + 19 = 864</math>; <math>2 \times 40 = 80</math> ; <math>4 \times 47 = 188</math> <math>864 + 80 + 188 = 1132</math> were in boats <b>only 705 survived</b> ; 1178 could have survived if full. So <math>2227 - 1178 = 1049 / 65 = 16.13...</math>we would need 16 /65 person boats and one 40 person boat that would have an extra 31 seats.</p>
<p><b>QUESTION</b> Does the answer make sense? Did you double check the math? Is it reasonable?</p>	<p>The answer makes sense. It is basic math, but I needed to read through the text and pick out the information. I want to know why only 705 survived. I'll have to read more of the text to find out! Just Read, Florida! 2008</p>

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Handout 3 is a clean copy

*Data Chart:*  
*Some of the food stored on the Titanic*

Characteristics Listed Across the Top  
Examples of Content Listed Down the Left Column



<i>Food on the Titanic</i>	Fresh	Crated / Barrel or like	Frozen
Meat	75,000 lbs or 34,000kg		
Eggs	40,000		
Coffee		2,200 lbs or 1,000 kg.	
Ice Cream			1,750 quarts or 1,990 L.



# Using Data Charts

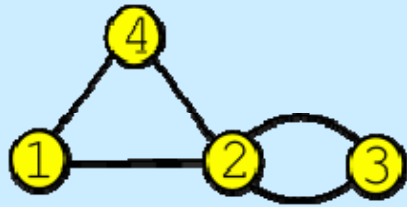
- “Data charts are grids that students make and use as a tool for organizing information about a topic” (Tompkins, 2004, p. 27)



The image shows a data chart titled "Planet Data" with a grid structure. The columns are labeled "Planet", "Distance from Sun (in millions of miles)", "Number of Moons", and "Length of Year (Earth Days)". The rows list planets from Mercury to Neptune, with their corresponding data values.

Planet	Distance from Sun (in millions of miles)	Number of Moons	Length of Year (Earth Days)
Mercury	36	0	88
Venus	68	0	225
Earth	93	1	365
Mars	142	2	687
Jupiter	484	16	4,333
Saturn	954	18	9,450
Uranus	1,920	15	29,500
Neptune	2,878	14	59,800

These can be used to organize facts, or simply help students to think about knowledge before experiencing it. It can be used for cues, questions, and a variety of formats can be utilized.



Math problem from  
**“Good Will Hunting”**  
posed in a linear algebra  
class.



**“ A Beautiful  
Mind”** The story  
of John Nash and  
his mathematical  
mind



**“Proof”** A play being  
made into a movie has its  
top 4 characters who are  
mathematicians. The idea  
of proofing is used in all  
aspects of life throughout  
the movie.

# How do we accomplish this?

- Meaningful collaboration for teachers and students
- Provide authentic experiences for students
- Student-centered learning must evolve
- Meaningful professional development for educators
- Comprehension instruction must continue to be a focus during the reading to learn years
- Learning in **isolation** for teachers and students can be minimized by collaboration and integration of curricular areas



- “I read the words but what do they mean?”
- (Tovani, 2000, p. 15)

Beginning with the end in mind, educators need to focus their energies to help all students make meaning.

“Good readers use reading, writing, and talk to deepen their understanding of content”  
(Tovani, 2004, p. 20).

*John Holt, education reformist and advocate for children's rights once stated,*

**What children need is NOT new and better curricula but *access to more and more of the real world*; plenty of time and space to think over their experiences, and to use fantasy and play to make meaning out of them; and advice, road maps, guidebooks, to make it easier for them to get where they want to go (not where we think they ought to go), and to find out what they want to find out.**

( *Education Quotes Blog* @ [http://educationquotes.blogspot.com/2007/09/education-quote\\_24.html](http://educationquotes.blogspot.com/2007/09/education-quote_24.html) accessed [January 24, 2008](#)).



# Final Thoughts

- “Literacy instruction does not take place in a vacuum; the content that teachers teach occur in a social, cultural, political, and historical context”

(Freire & Macedo, 1987; Giroux, 1988; as cited in Tompkins, 2006, p. 15 ).

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