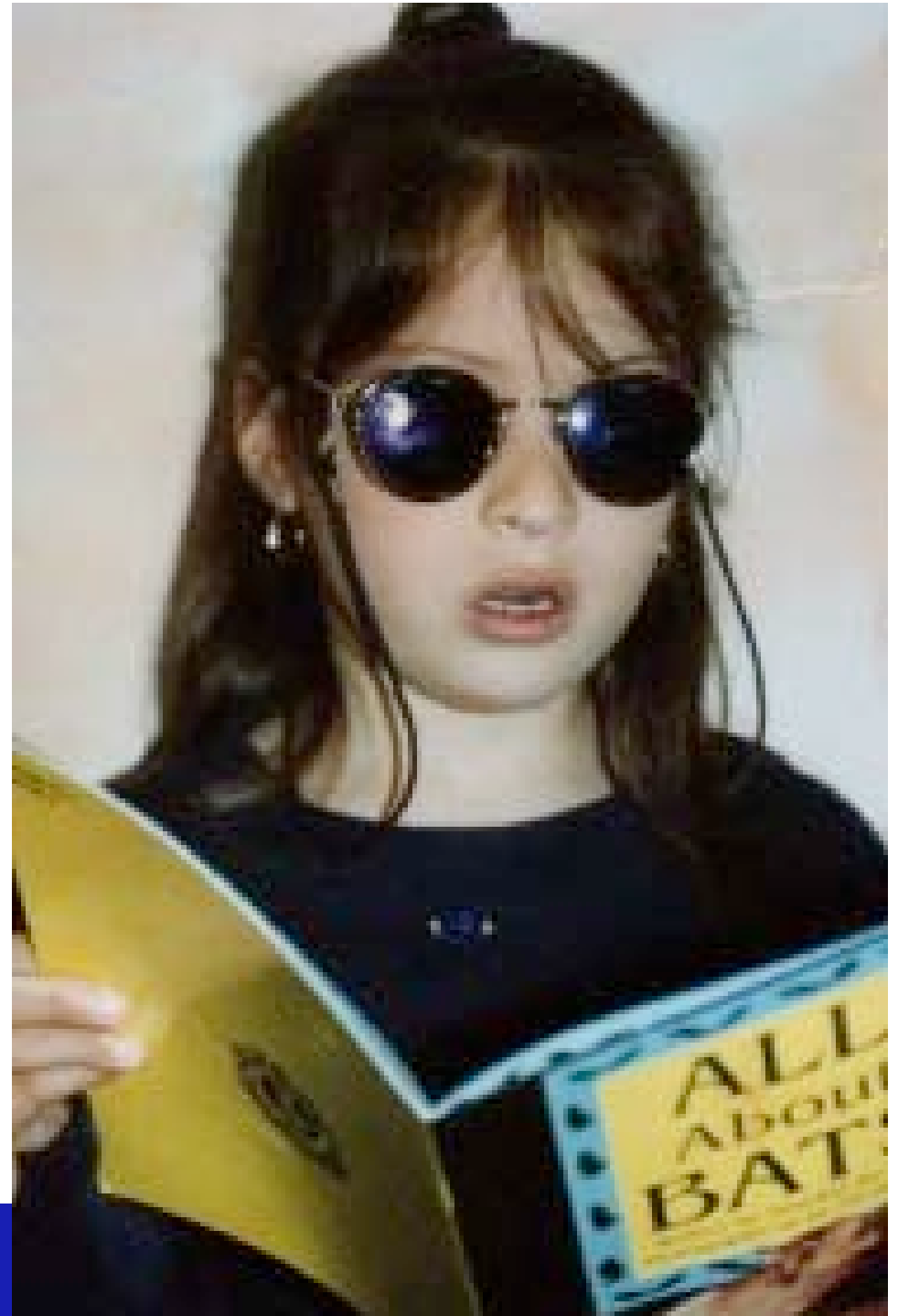


# Five Reasons for Making Science Content/Texts Central to Language Arts/Reading

Elfrieda H. Hiebert  
University of California,  
Berkeley

IRA Institute 2005

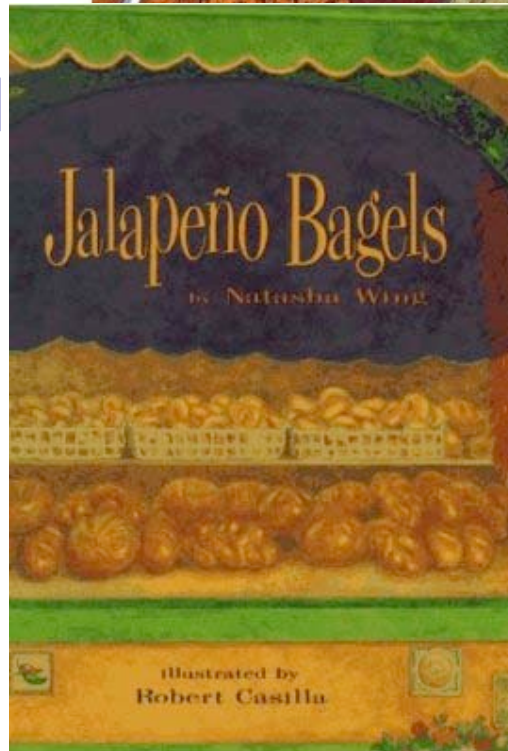
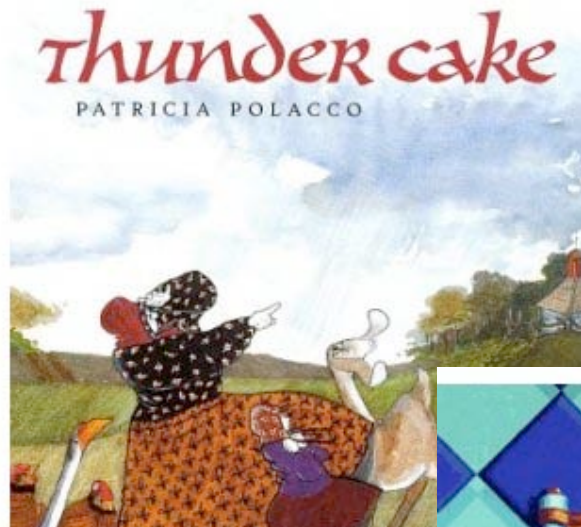


# The Underlying Perspectives

- **Reading is taking up an increasing amount of the school day that might be devoted to other subject areas such as science. Further, reading of informational texts accounts for a substantial amount of the reading that adults do: approximately 58% (Smith, 2000)**
  - **The reading curriculum needs to move significantly beyond narrative to give students the reading content and strategies they need to be successful throughout school and life.**

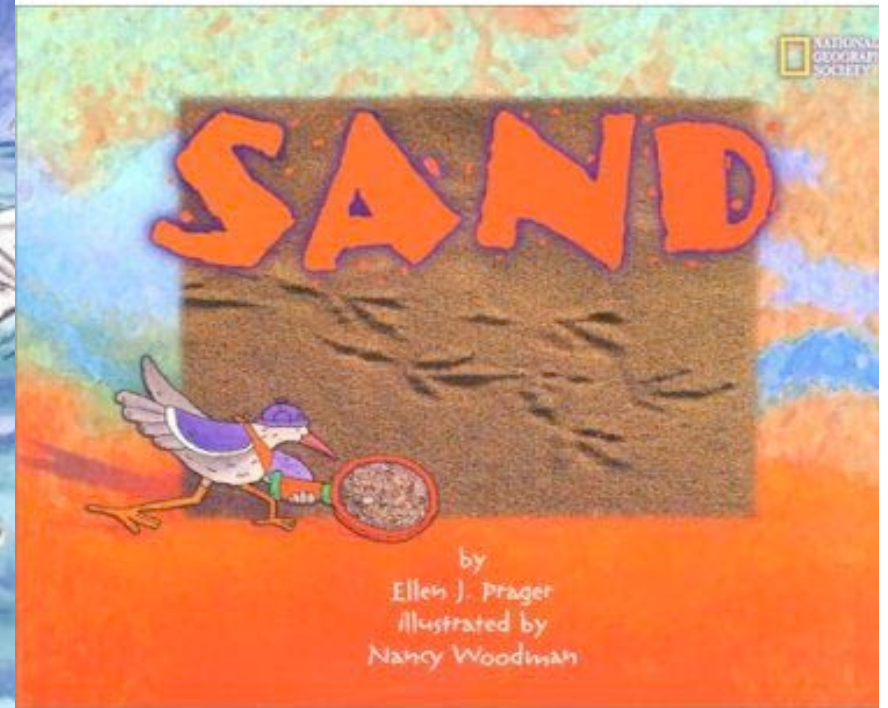
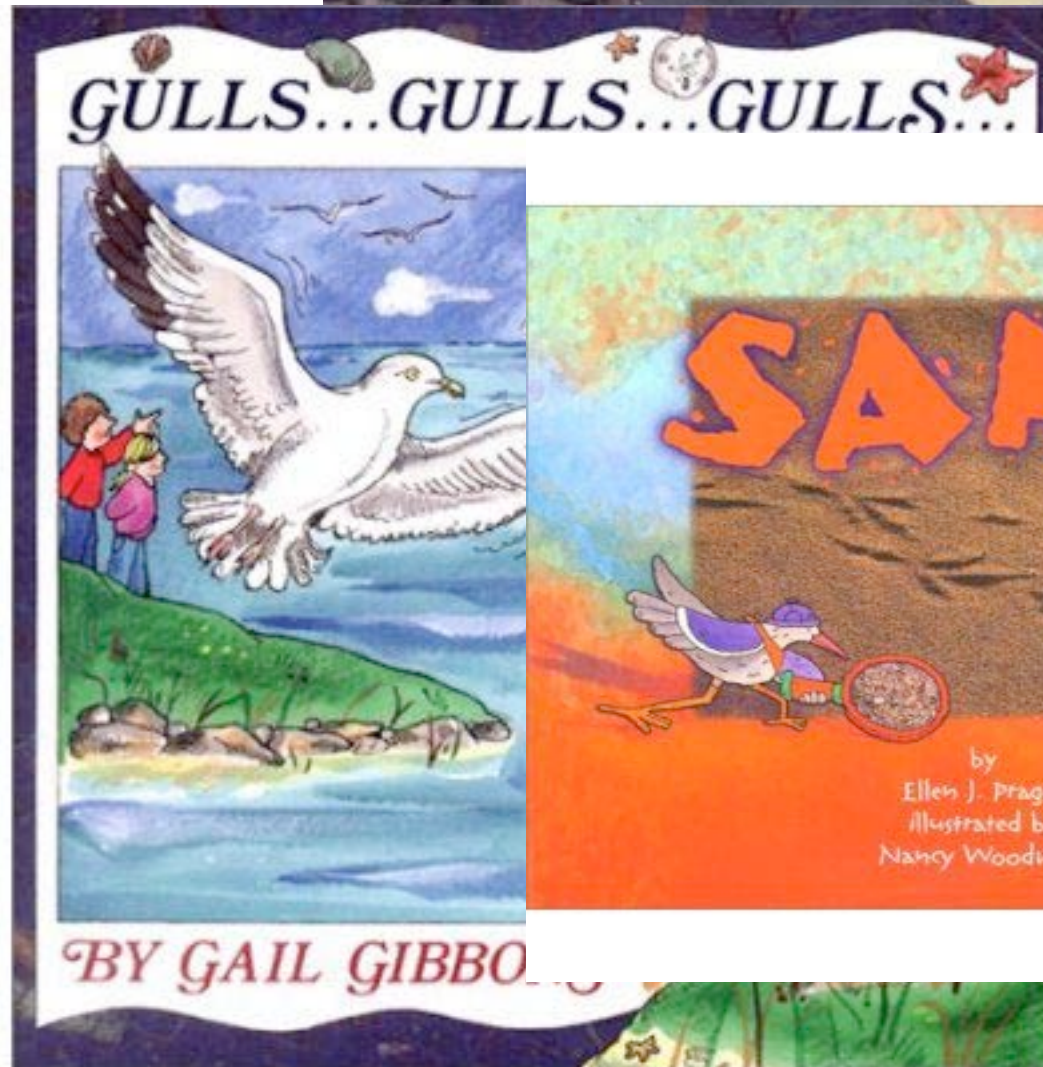
- **Science learning is grounded in inquiry-based experiences. Texts provide a way of elaborating and extending knowledge and, for some forms of content, a source.**
  - **In other words, texts are not seen to be the sole source of science content by any stretch of the imagination.**

- 3 Narrative Trade Books (from a literature-based anthology) (all award winners from literacy or Library associations)





- **3 Science Trade Books**  
(all award winners--  
National Science Teachers Association)



**1. A goal of a literacy program is to support students' extension and elaboration of background knowledge. Science is a primary source for background knowledge.**

# When the goal is remembering, not just comprehending: Narrative

	The content to be remembered
<i>Thunder Cake</i>	Grandmother helps her granddaughter overcome her fear of thunder by baking a special cake while a storm threatens. As lightning gets closer, Grandmother has child gather eggs, milk cow, go to shed for sugar, chocolate, flour, & pick strawberries. When storm hits, they eat chocolate cake.
<i>Carousel</i>	Alex's disappointment at her father's failure to arrive home from a business trip for her birthday party overshadows all of her mother and aunts' attempts at festivity. Finally, Alex's bad temper leads to bad manners. Sent to her room without cake, she breaks her father's gift, a music-box carousel. When she falls asleep, the animals come to life and she rides them through the night. She awakens to find her father. Alex is sorry at having spoiled the party and broken the carousel.
<i>Jalapeno Bagels</i>	When Pablo must bring something to share for his school's International Day, he considers several items from his family's bakery. But his mother's Mexican pan dulce, empanadas, and chango bars don't do the trick nor do his father's bagels and challah bread. Then the boy helps to make the family specialty, Jalapeno bagels, a joint creation from the cultures of both parents and decides that it is the perfect contribution for school.

# When the goal is remembering, not just comprehending: Science texts

	The content to be remembered
<i>Gulls...gulls... gulls</i>	The habits and life cycle of North America's most common gull, the herring gull, are described including the manner in which they keep their feathers waterproof, forms of communication, and breeding and migration patterns.
<i>Crab moon</i>	On the night of a new, full moon on the shoreline of the Delaware Bay, thousands of horseshoe crabs come ashore to spawn.
<i>Sand</i>	Differences in the formation and composition of sands of various colors are described as is the manner in which sand gets from one location to another.



**2. Goals of a literacy program include teaching strategies to use when texts are challenging and supporting construction of meaning through discussion. Science texts have structures and content that can be rendered more meaningful through applying comprehension strategies. Science texts also have content that merits extensive discussion.**

# Topics for Discussion

***Crab Moon (within the text):*** “How could this crab follow unless someone turned her over?”

***Sand (within the text):*** “...scoop up a handful of sand. What is it made of? How did it get there? Look for clues hidden in the grains..”

***Thunder Cake (about the text):*** The ingredients of the cake are gathered and the cake mixed and then baked from the time the lightning is approximately 10 miles away to the time it hits. How fast was the storm traveling? Is this typical of storms in northern Michigan?

**3. A goal of a literacy program is to teach students vocabulary-- especially new academic/scientific meanings for known words and the academic/scientific meanings for new concepts. Science texts have a high percentage of both types of words.**

# Words in Two Types of Texts

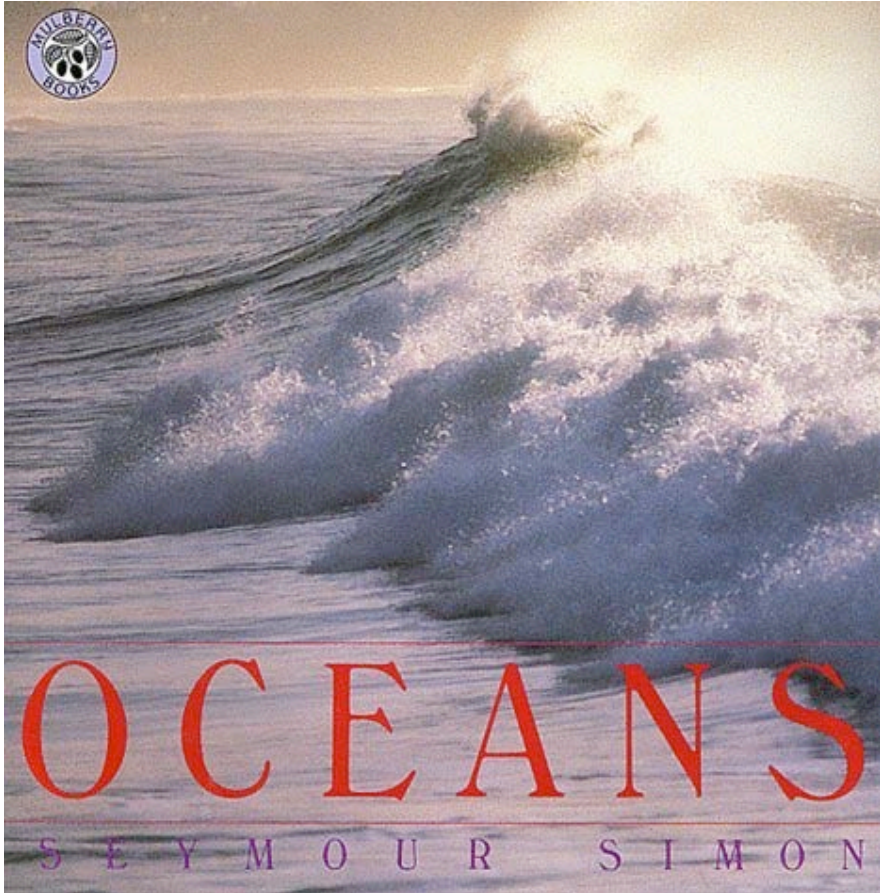
Frequency of appearances per 1 million words	Narrative	Informational
10 to 99	Alex thunder grandma	feathers crystal lava
1 to 9	braided zebra bagel	coral migration magnifier

**4. A goal of a literacy program is to support students' automatic and accurate reading of texts. Science texts are characterized by the features that make texts appropriate for fluency development (fewer unique words that are multisyllabic and rare and repetition of critical words).**

# Presence of Multisyllabic, Rare Words

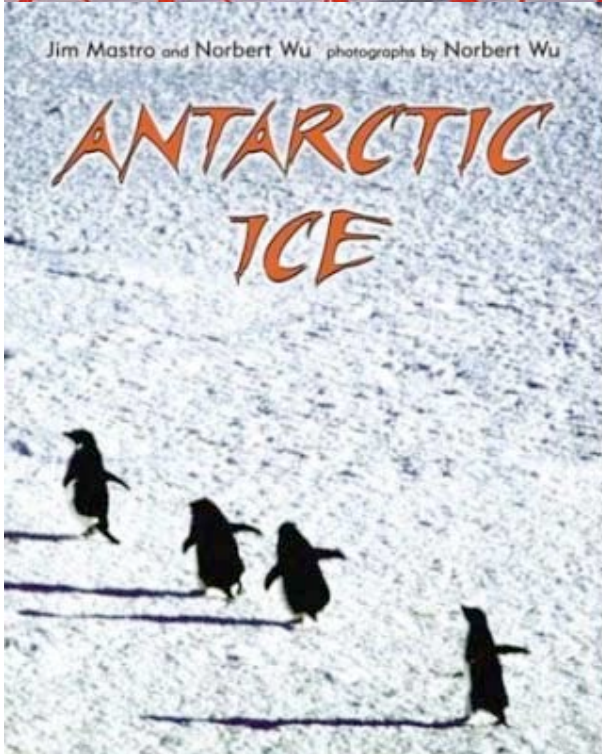
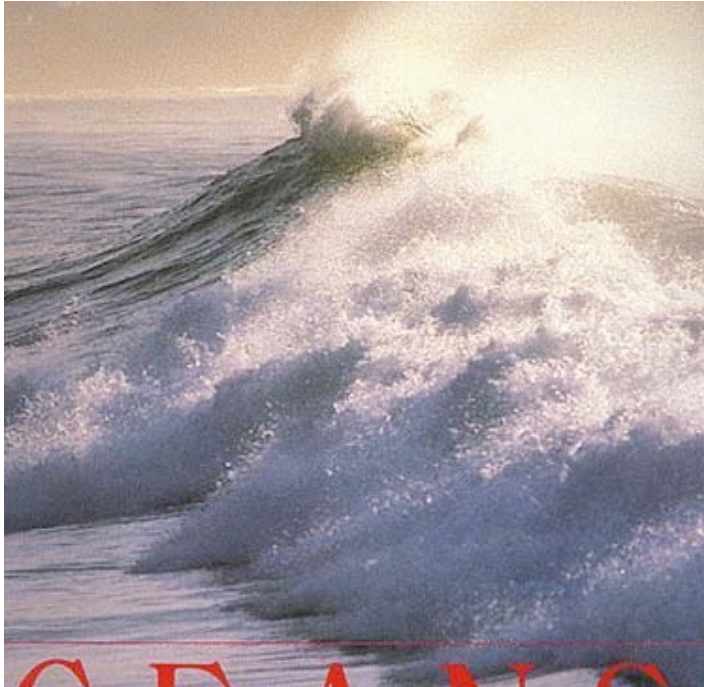
Appearances per 1 million words	Narrative Trade Books	Informational Trade Books
100+	94 per 100	96 per 100
10-99	3 per 100	3 per 100
0-9	3 per 100	1 per 100

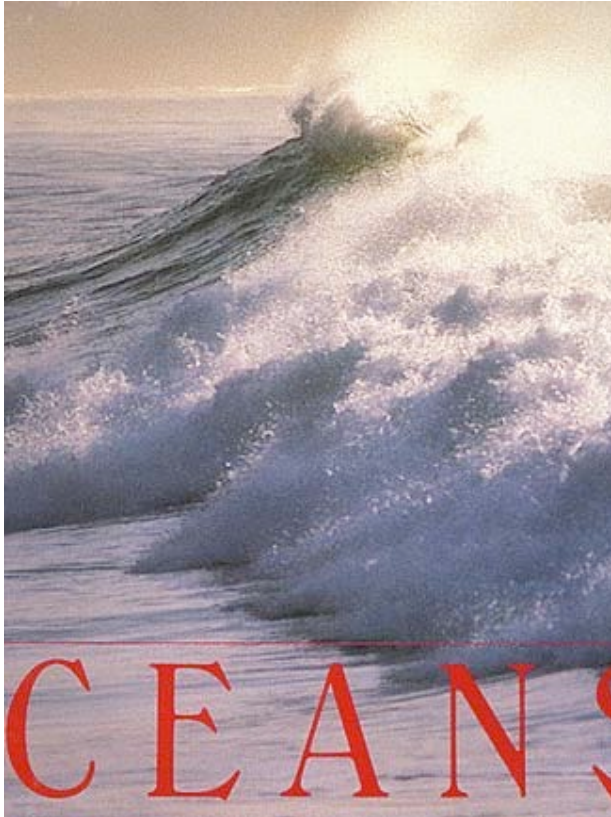
**5. A goal of a literacy program is to engage students in frequent reading that extends beyond the classroom. Science content is of high-interest to many students.**



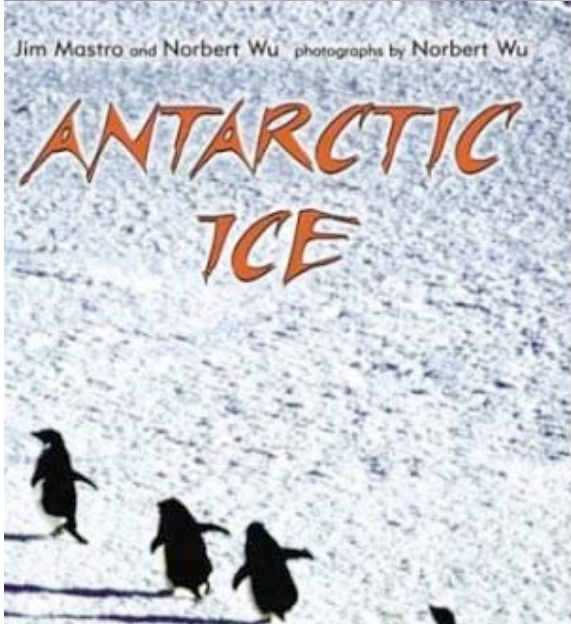
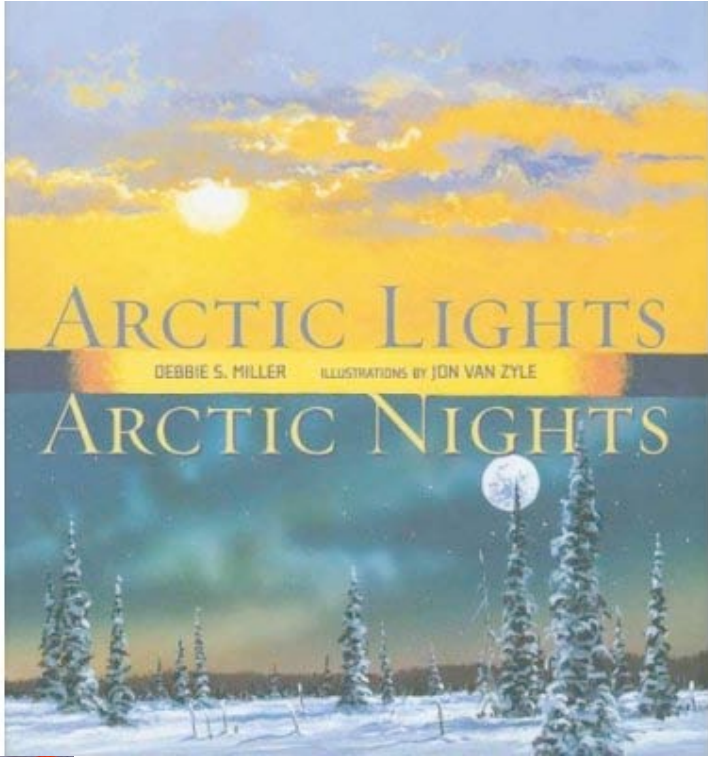
IRA Institute 2005





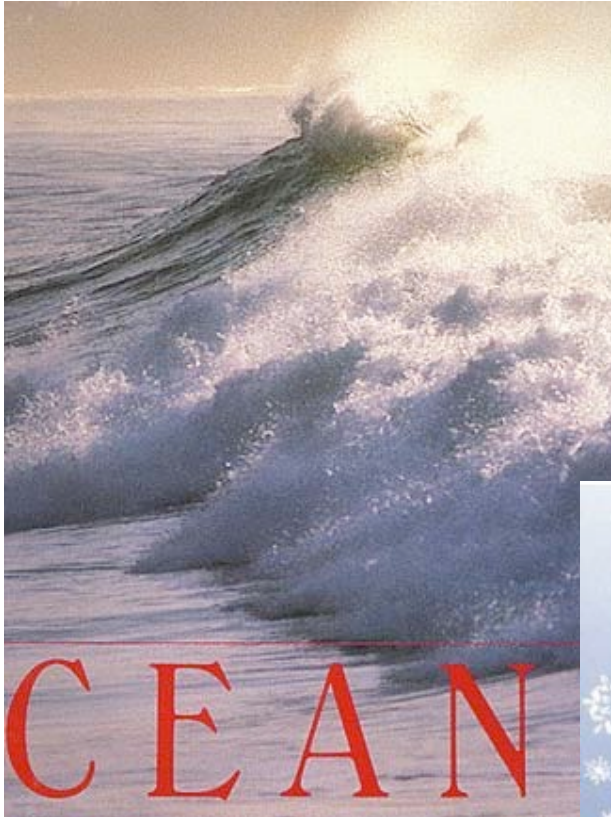


CEANS

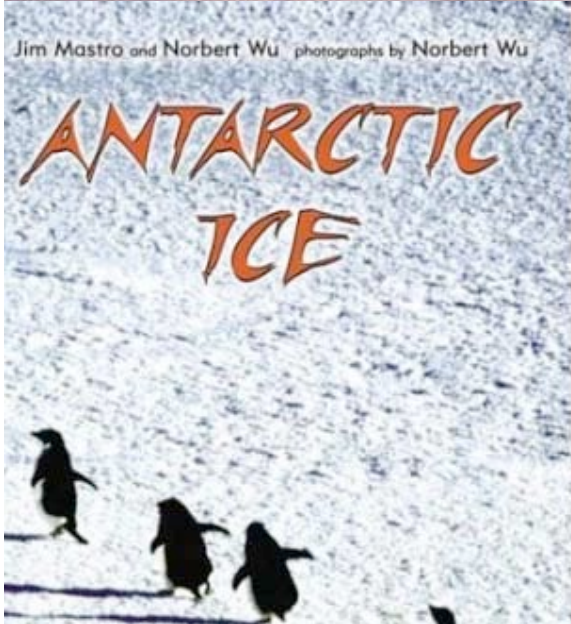


N



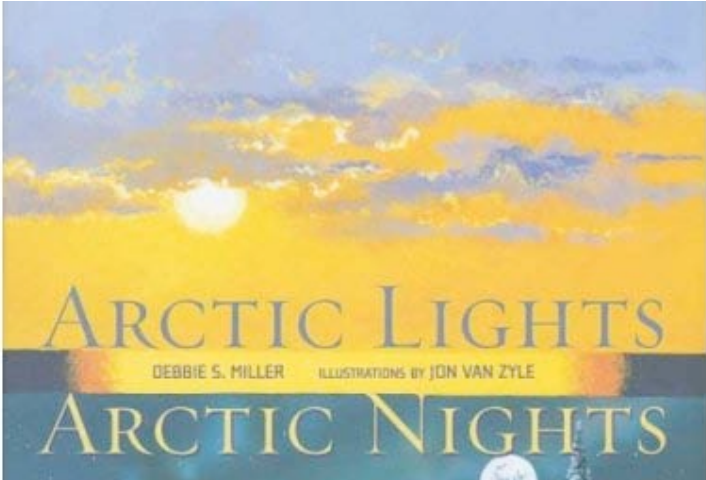


# C E A N



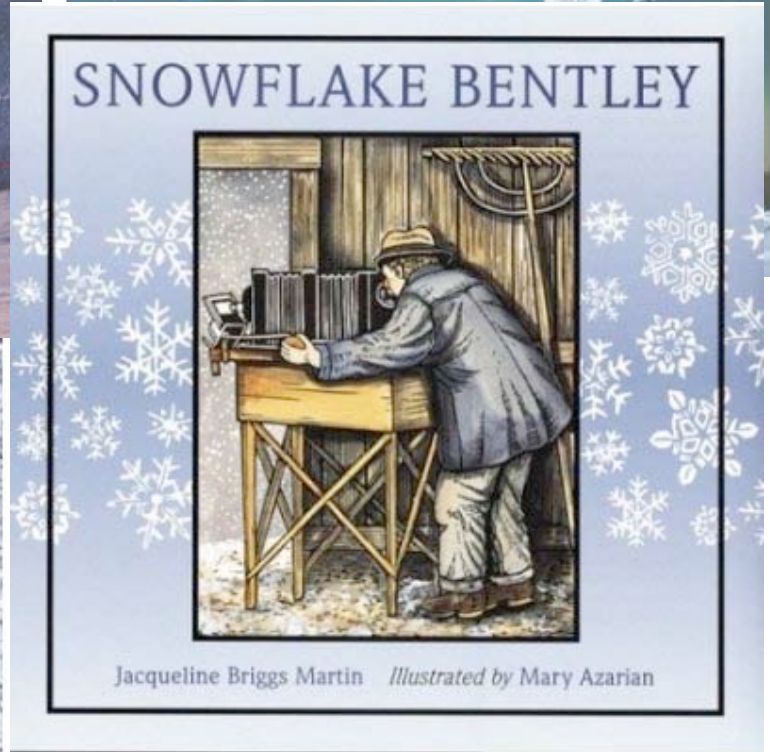
Jim Mastro and Norbert Wu photographs by Norbert Wu

# ANTARCTIC ICE



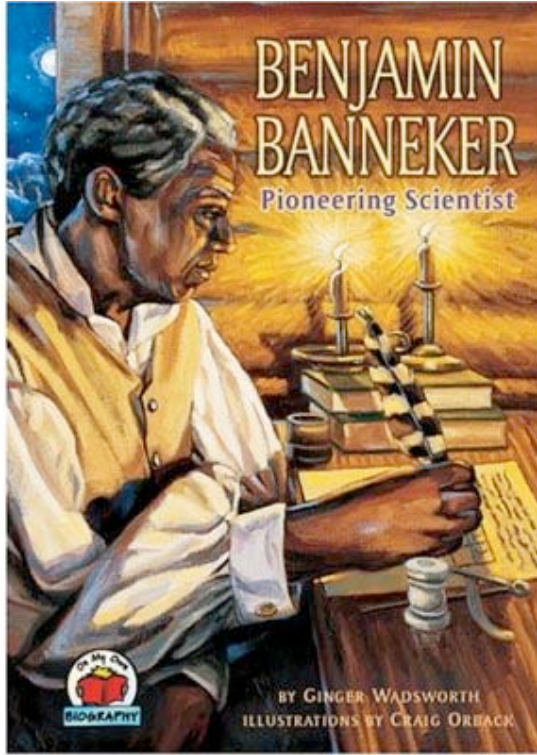
# ARCTIC LIGHTS ARCTIC NIGHTS

DEBBIE S. MILLER ILLUSTRATIONS BY JON VAN ZYLE



# SNOWFLAKE BENTLEY

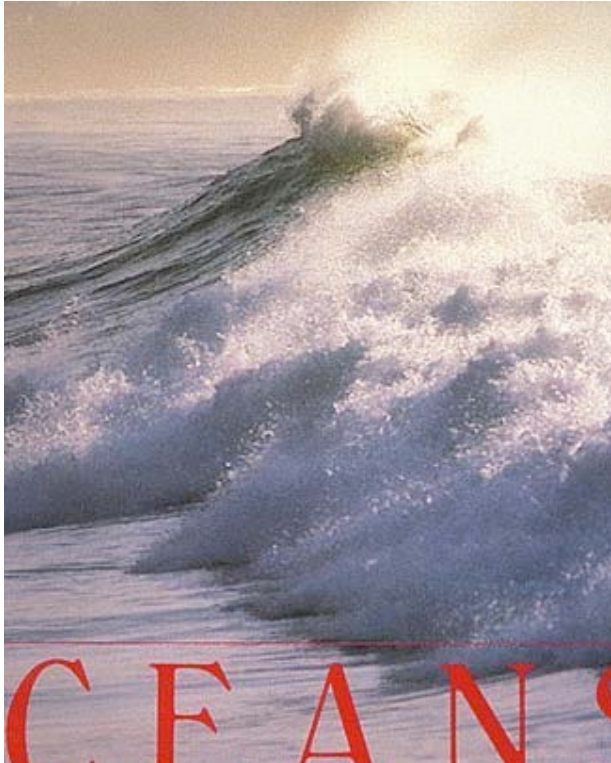
Jacqueline Briggs Martin Illustrated by Mary Azarian



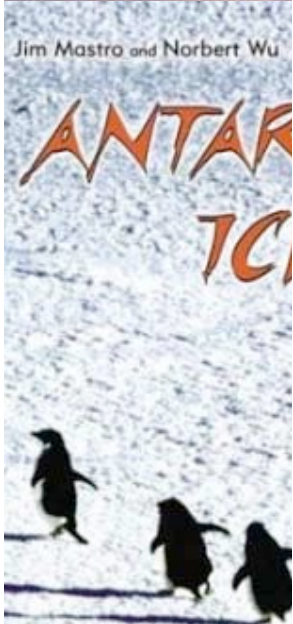
# BENJAMIN BANNEKER Pioneering Scientist

BY GINGER WADSWORTH  
ILLUSTRATIONS BY CRAIG ORBACK



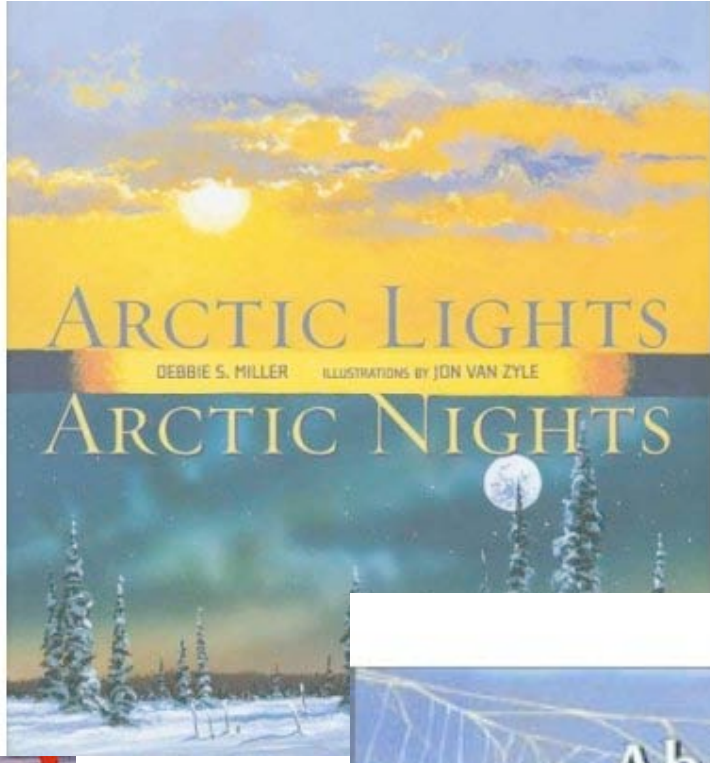


# OCEANS



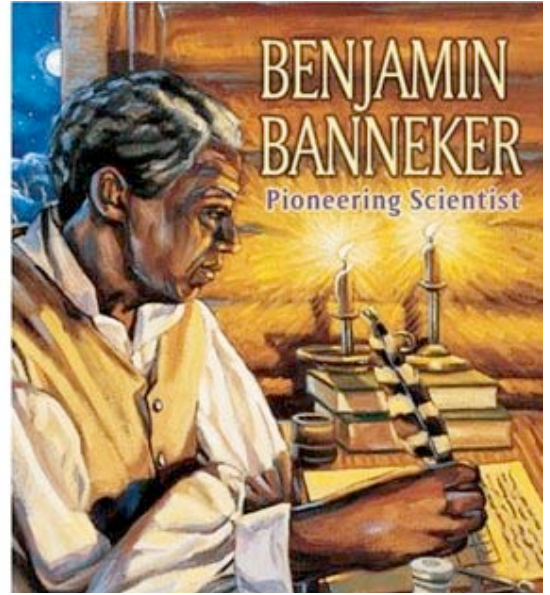
Jim Mastro and Norbert Wu

# ANTARCTIC



# ARCTIC LIGHTS ARCTIC NIGHTS

DEBBIE S. MILLER ILLUSTRATIONS BY JON VAN ZYLE



# BENJAMIN BANNEKER Pioneering Scientist



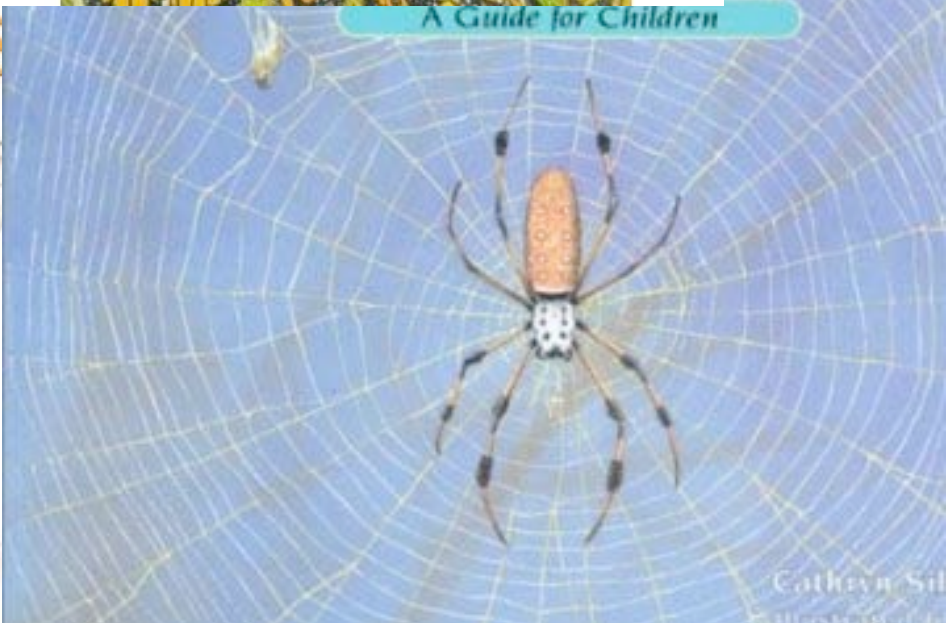
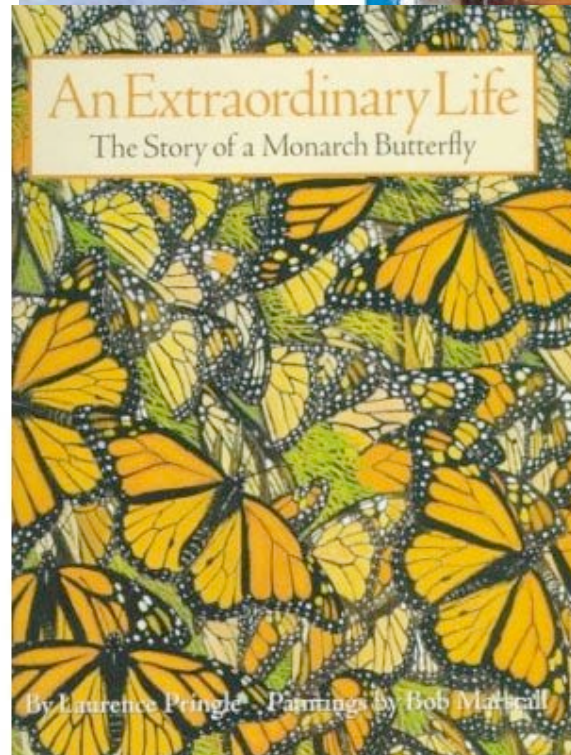
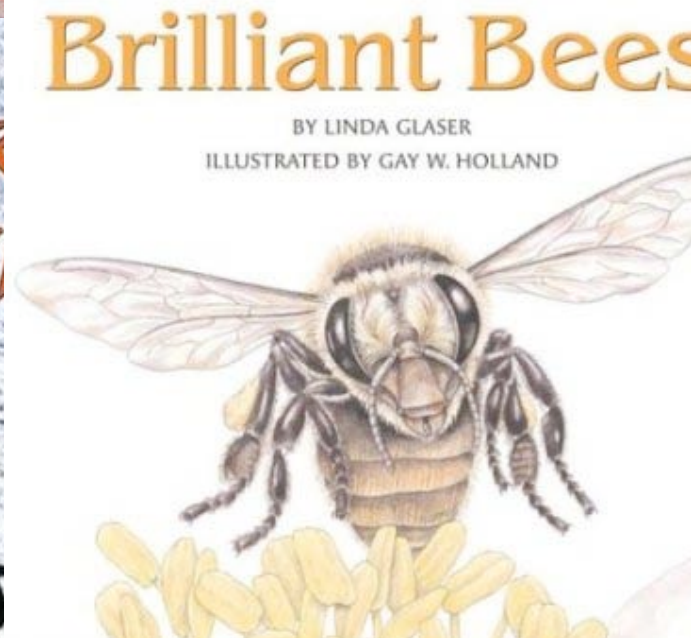
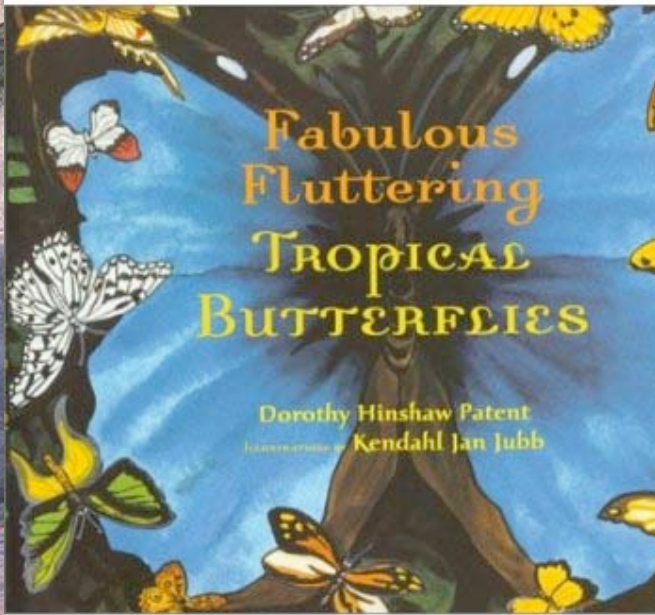
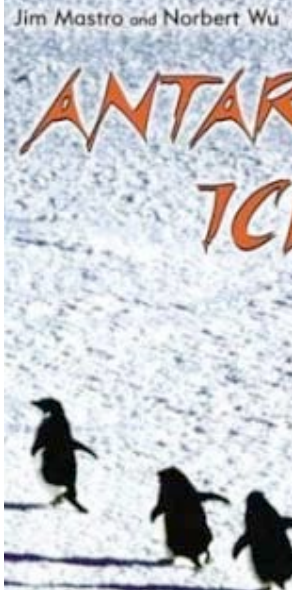
# Brilliant Bees

BY LINDA GLASER  
ILLUSTRATED BY GAY W. HOLLAND



# About Arachnids A Guide for Children

Cathryn Sill  
Illustrations by Cathryn Sill



# Overview of the day

Plenary	<b>Seeds of Science, Roots of Reading</b> (Lawrence Hall of Science/UC-Berkeley)
	A. Seeds/Roots
Plenary	<b>Center for Learning Technologies in Urban Schools (LeTUS)</b> (U of M, Ann Arbor)
	B. Seeds/Roots
Plenary	<b>Guided Inquiry Project (GIsML)</b> (U of M, Ann Arbor)
	B. Seeds/Roots C. Seeds/Roots
Plenary	Day's Summary

# Overview of the day

	Seeds of Science, Roots of Reading
Concurrent	<b>A. Seeds/Roots</b> <b>B. LeTUS</b> <b>C. GIsML</b>
	Center for Learning Technologies in Urban Schools (LeTUS)
Concurrent	<b>A. GIsML</b> <b>B. Seeds/Roots</b> <b>C. LeTUS</b>
Concurrent	<b>A. GIsML</b> <b>B. Seeds/Roots</b> <b>C. Seeds/Roots</b>

# Overview of the day

Plenary	<b>Seeds of Science, Roots of Reading</b> (Lawrence Hall of Science/UC-Berkeley)
Concurrent	<b>A. Seeds/Roots</b> <b>B. LeTUS</b> <b>C. GIsML</b>
Plenary	<b>Center for Learning Technologies in Urban Schools (LeTUS)</b> (U of M, Ann Arbor)
Concurrent	<b>A. GIsML</b> <b>B. Seeds/Roots</b> <b>C. LeTUS</b>
Plenary	<b>Guided Inquiry Project (GIsML)</b> (U of M, Ann Arbor)
Concurrent	<b>A. GIsML</b> <b>B. Seeds/Roots</b> <b>C. Seeds/Roots</b>
Plenary	Day's Summary