

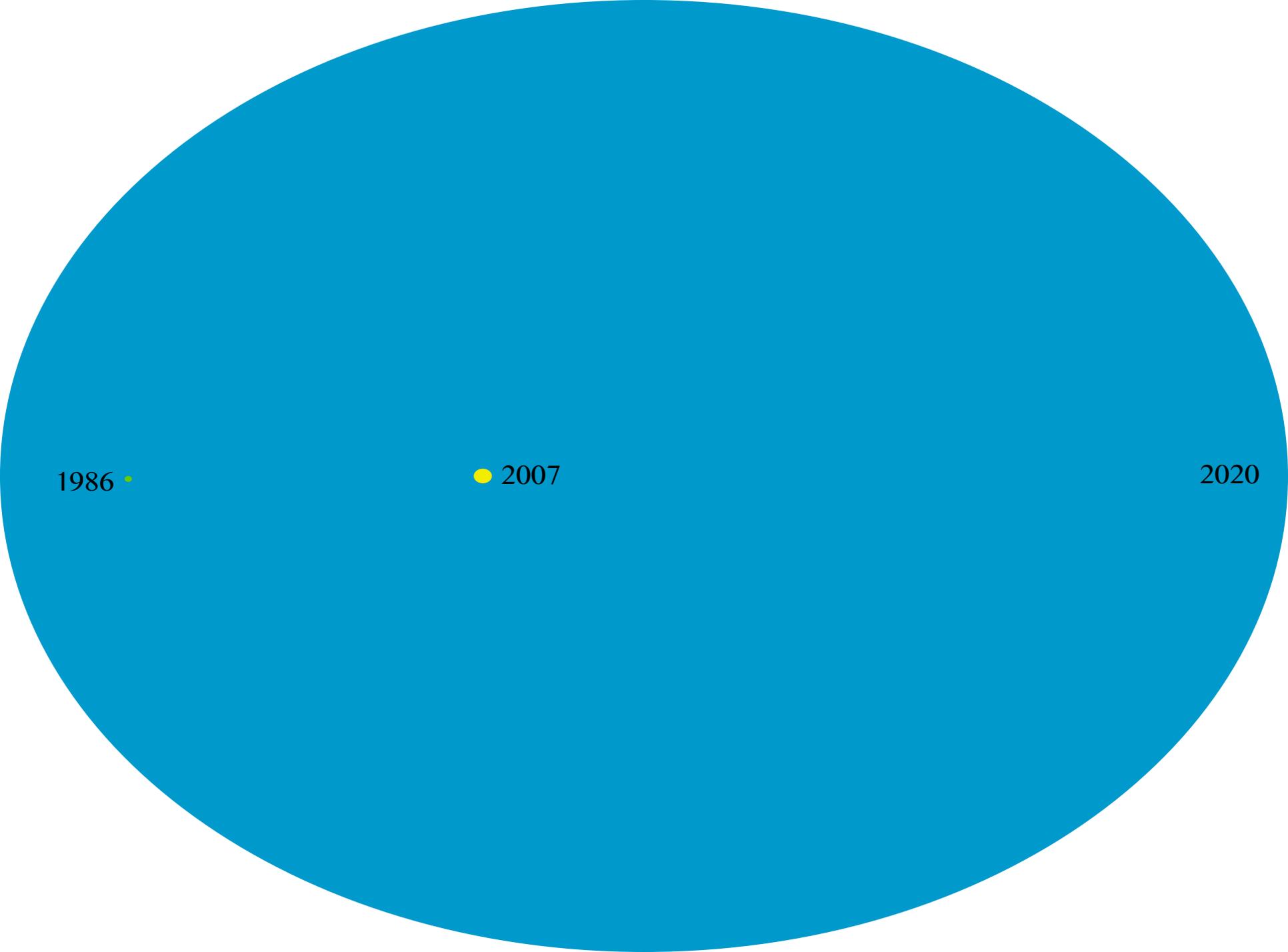
# Vocabulary: The Key to Unlocking Knowledge

Elfrieda H. Hiebert  
TextProject



# GPS

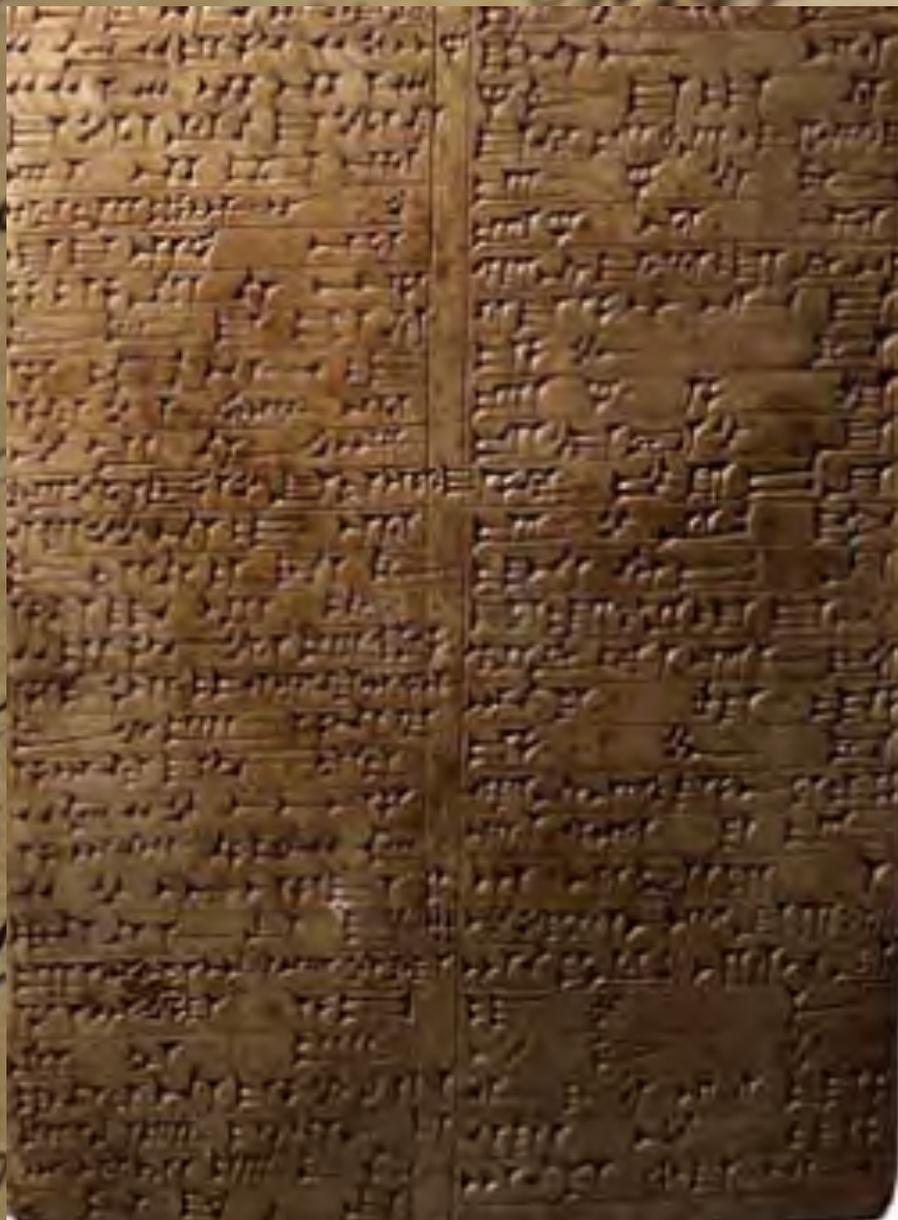
- **Humankind's knowledge is stored in text. From the start, we read to learn—both stories and information.**



1986

2007

2020



## Different Labels But the Same Concepts

### English Learners

**Example 1:** “I’m going to catch a crab today,” yelled Sailor Paul. Soon his nets were full and taut, and Paul hauled them up on the dock. “Get away, silly squid,” scolded Sailor Paul. “Don’t sprawl on my yawl!” (Sailor Paul and the Crabs, Paulson, 2000)

**Example 2:** The children are drawing pictures. Ann draws a green lawn. What’s on the lawn? A little deer or a fawn is on the lawn. Ben draws a pile of yellow straw. What is in the straw? A fawn lies in the straw. (Drawing Pictures, Hebert, 2019)

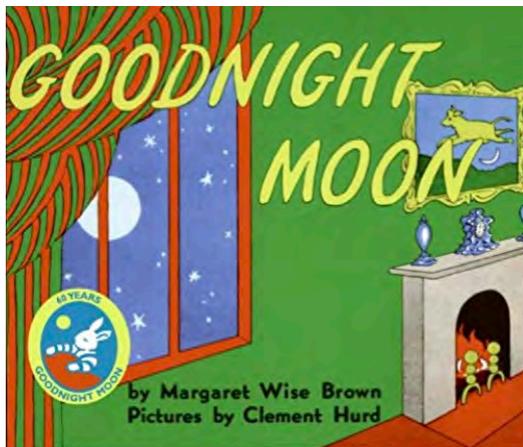
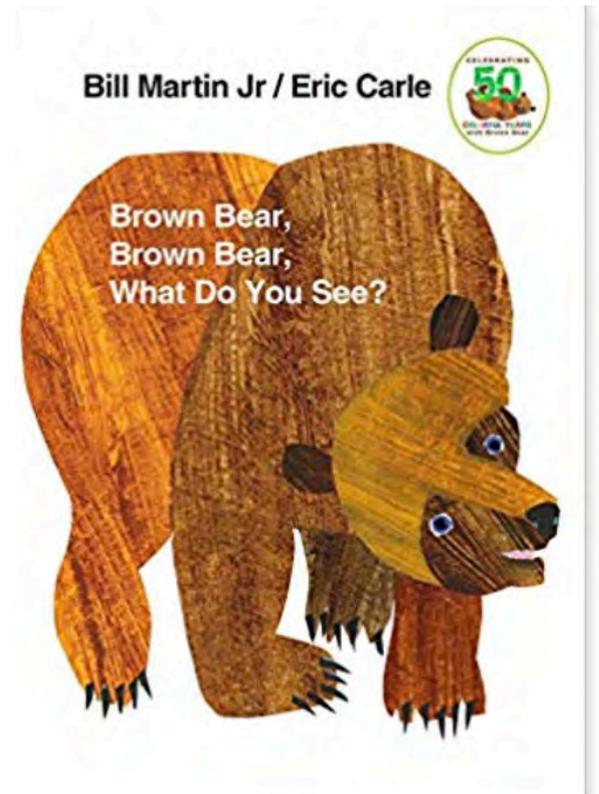
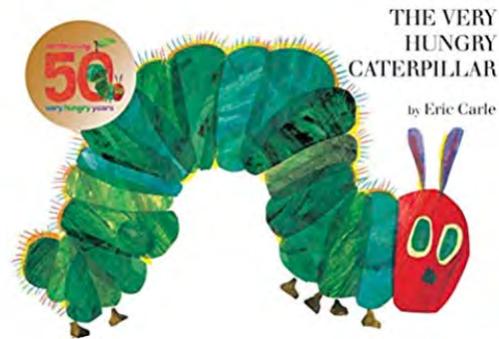
In the United States as we approach a new decade—2020—about 10% of our students enter school speaking native languages other than English (McFarland et al., 2018). English learners (ELs) may not have English labels for concepts, but they do have labels for concepts in their native languages. In the usual materials and approaches of English/Language Arts, ELs are asked to learn to read words for which most young children do not have associated meanings in their native language, such as *taut* and *yawl* in Example 1. Instructional demands such as those represented by the first excerpted text can intensify the challenge for ELs. Example 2 illustrates a text where students’ knowledge of activities (e.g., drawing) and aspects of nature (e.g., animals, growing things) are the foundation for learning new concepts such as *fawn* and *lawn*.

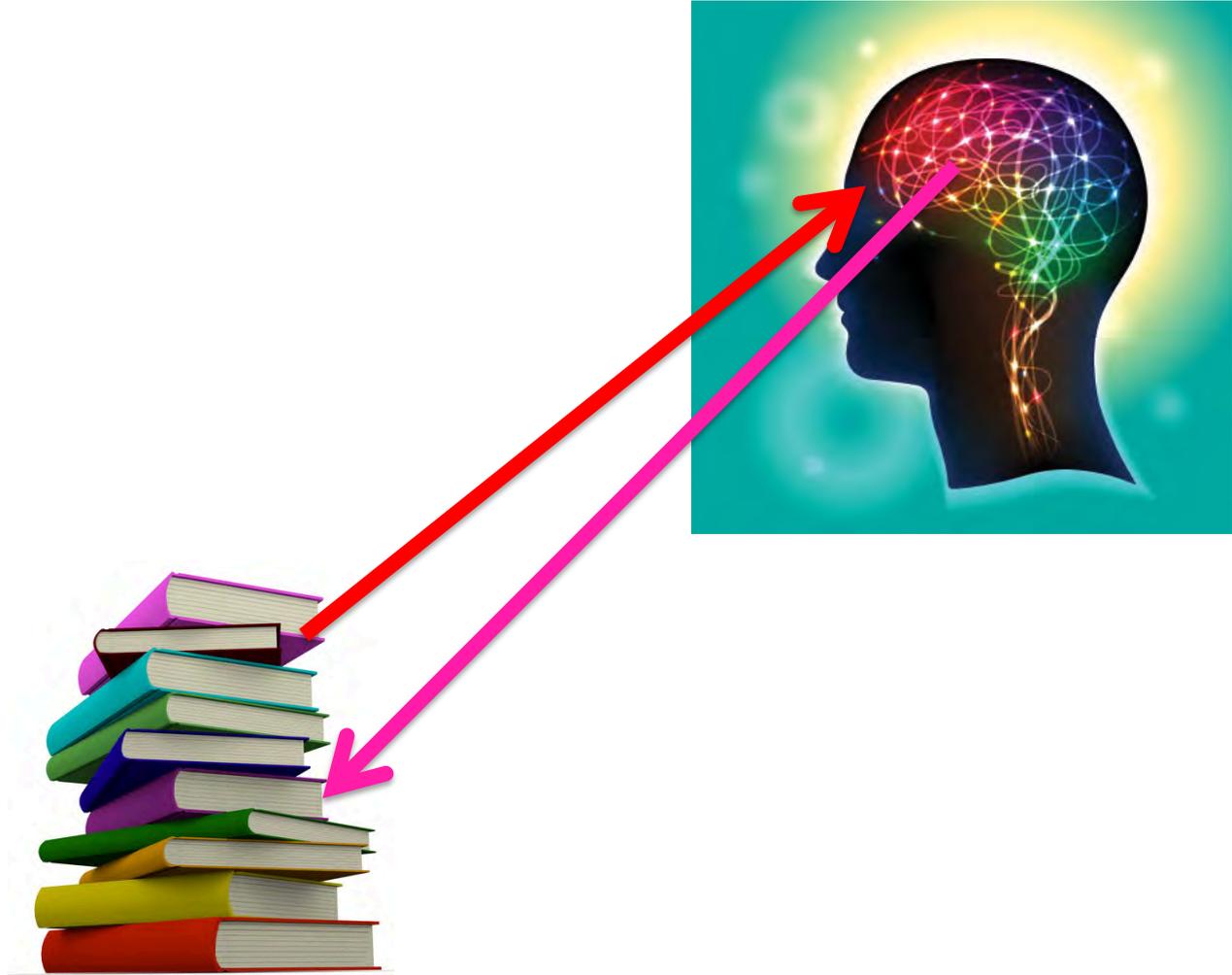
Additionally, evidence points to strengths of ELs, such as their acuity in attending to the sounds of language, which often are not recognized in schools. This chapter develops a perspective in which strengths that ELs bring to language learning are the foundation for the design of learning experiences for those students and in which











## **DISCUSSION**

**What percentage of the vocabulary is the same across texts on end-of-year STARR at Grades 3, 5, and 7?**

# M-STEP—Grade 3

One afternoon, Jessie spotted a tiny bird fluttering around Mrs. Baxter's front door. Mrs. Baxter had just moved into an apartment.

It's probably looking for somebody to fill the bird feeders, Jessie thought. The bird perched on the edge of the wreath. Then it disappeared.

Disappeared? Jessie ran over to Mrs. Baxter's door. Where had it gone?

A jumble of sticks and grass stuck out from the middle of the wreath. Suddenly, Jessie understood. A nest! A bird's nest sat right in the middle of Mrs. Baxter's wreath. The bird poked its head out and looked at Jessie. Then it fluttered away.

## M-STEP—Grade 5

Hermit crabs are nature's recyclers. Like many other crabs, the hermit crab eats waste. By living on sea scraps, hermit crabs help keep oceans and shores clean. Some hermit crabs hide in reefs or live in shallow waters, while others scuttle on the ocean floor. There are also hermit crabs that spend most of their lives ashore.

Unlike other crabs, the hermit crab has a thin outer shell over its soft tail. This makes the hermit crab easy prey for hungry predators. Hermit crabs stay safe by living in old seashells. A hermit crab is picky; it tries on many shells

# M-Step—Grade 7

The energy in all your food comes from the sun, 93 million miles away. How did the sun's energy end up in the things you eat? You can thank green plants. They contain **chlorophyll**-a substance that traps the energy in sunlight. This energy then helps plants change water from the soil and carbon dioxide from the air into oxygen and carbohydrates that power their cells. This process is called **photosynthesis**.

Most plants make more food than they need. They store the extra in their roots, leaves, stems, flowers, fruit, and seeds. So, when you eat **carrots, spinach, celery, cauliflower, bananas, or walnuts,**

# GPS

- **Words are the labels for concepts that underlie knowledge. 2,500 word families account for the majority of words in texts. These families represent major bodies of knowledge & English's linguistic systems.**



## *Oxford English Dictionary*

- 282,500 root or head words
- 326,000 derivatives & phrases
- 47,150 obsolete words

# Focus Vocabulary from a Core Program: Grade 3.3

examined

peak

fondly

steep

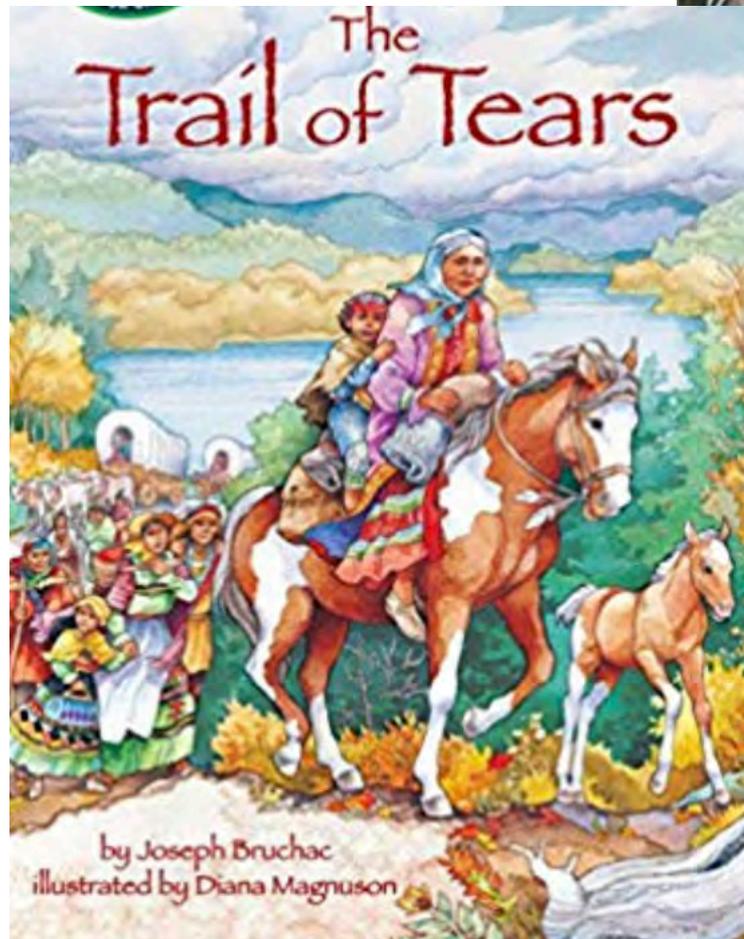
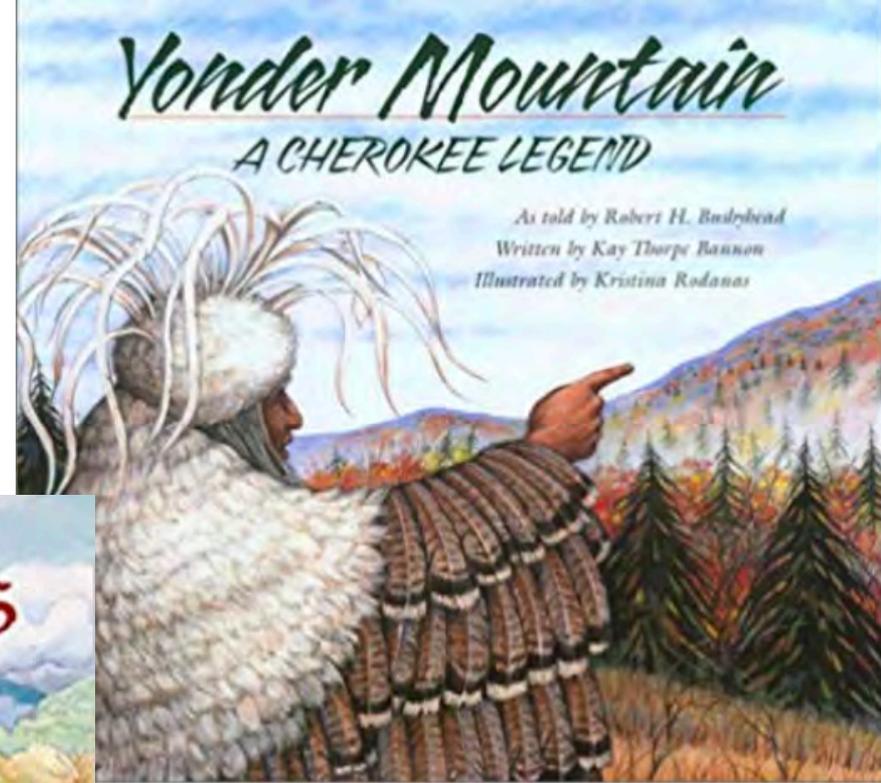
rugged

mist

pausing

pleaded

- Target texts:
  - *Yonder Mountain: A Cherokee legend*
  - *The Trail of Tears*



# Focus Vocabulary (also Third Grade)

**ruined**

**feast**

**model**

**concerned**

**schedule**

**yanked**

**streak**

**smear**

**glorious**

**studio**

**cardboard**

**fierce**

**flights**

**pitcher**

**treasure**

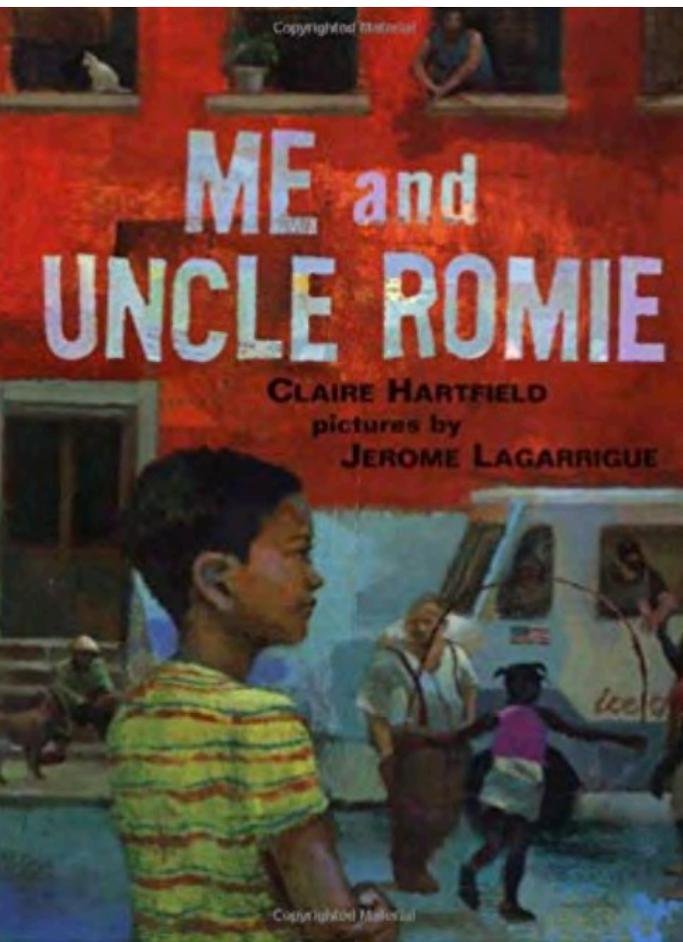
**stoops**



- Of 601 unique words, 11% are rare in written English
- In every 100 words, there are 8 rare words.



# Typical Choices



Program 1  
(2014)

**ruined**

**feast**

**model**

**concerned**

**schedule**

**yanked**

**streak**

**smear**

**glorious**

**studio**

Program 2  
(2013)

**ruined**

**feast**

**cardboard**

**fierce**

**flights**

**pitcher**

**treasure**

**stoops**



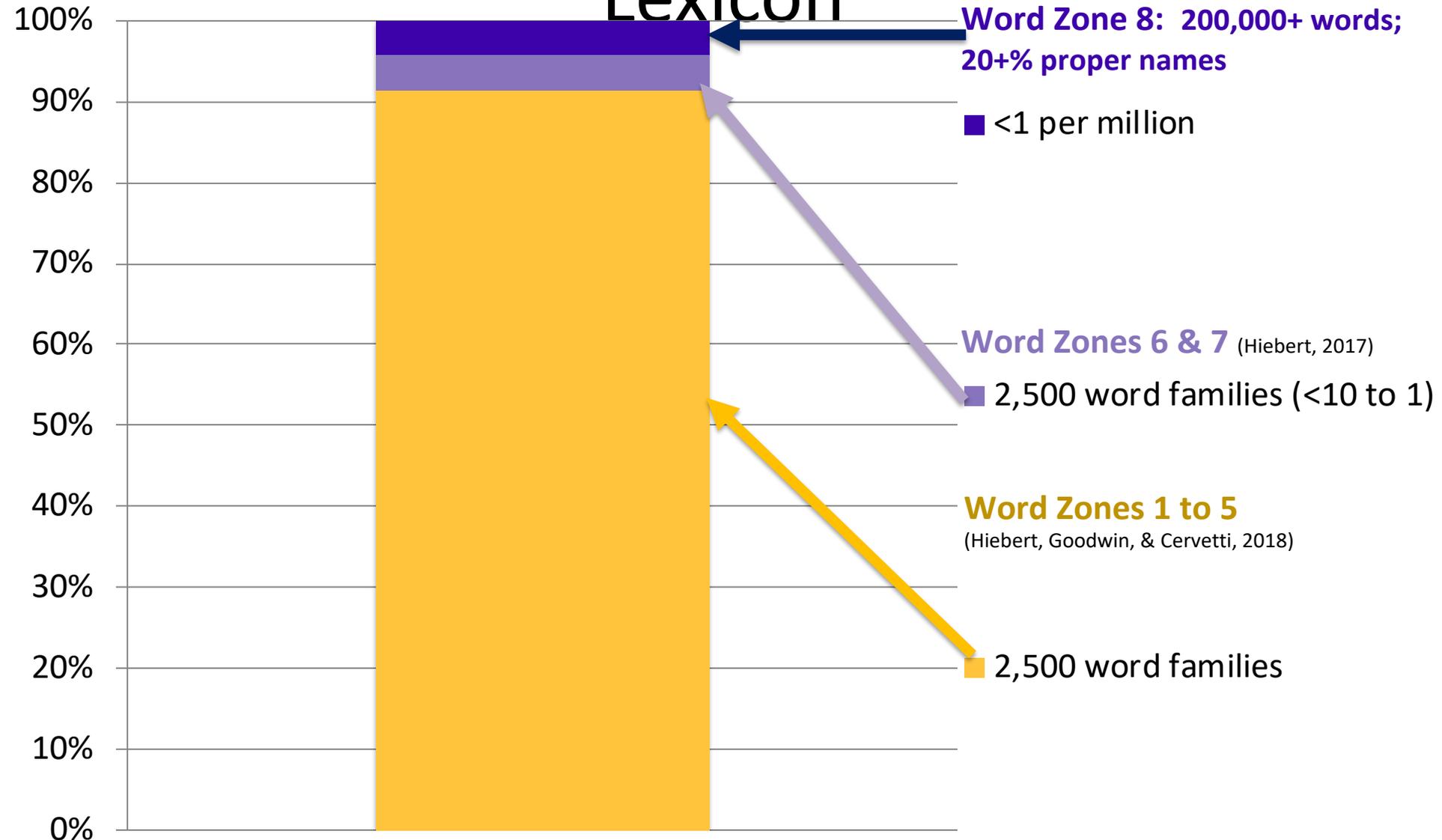
10,000 texts

# The Word Zone Profiler

Word	Word Length	Predicted times in a million words of text)	Age of Acquisition U	Complex Morphological Family	Mean Concrete ness Rating
ruined	6	13	7.16	34.6445	2.96
feast	5	13	7.81	15.8756	4.3

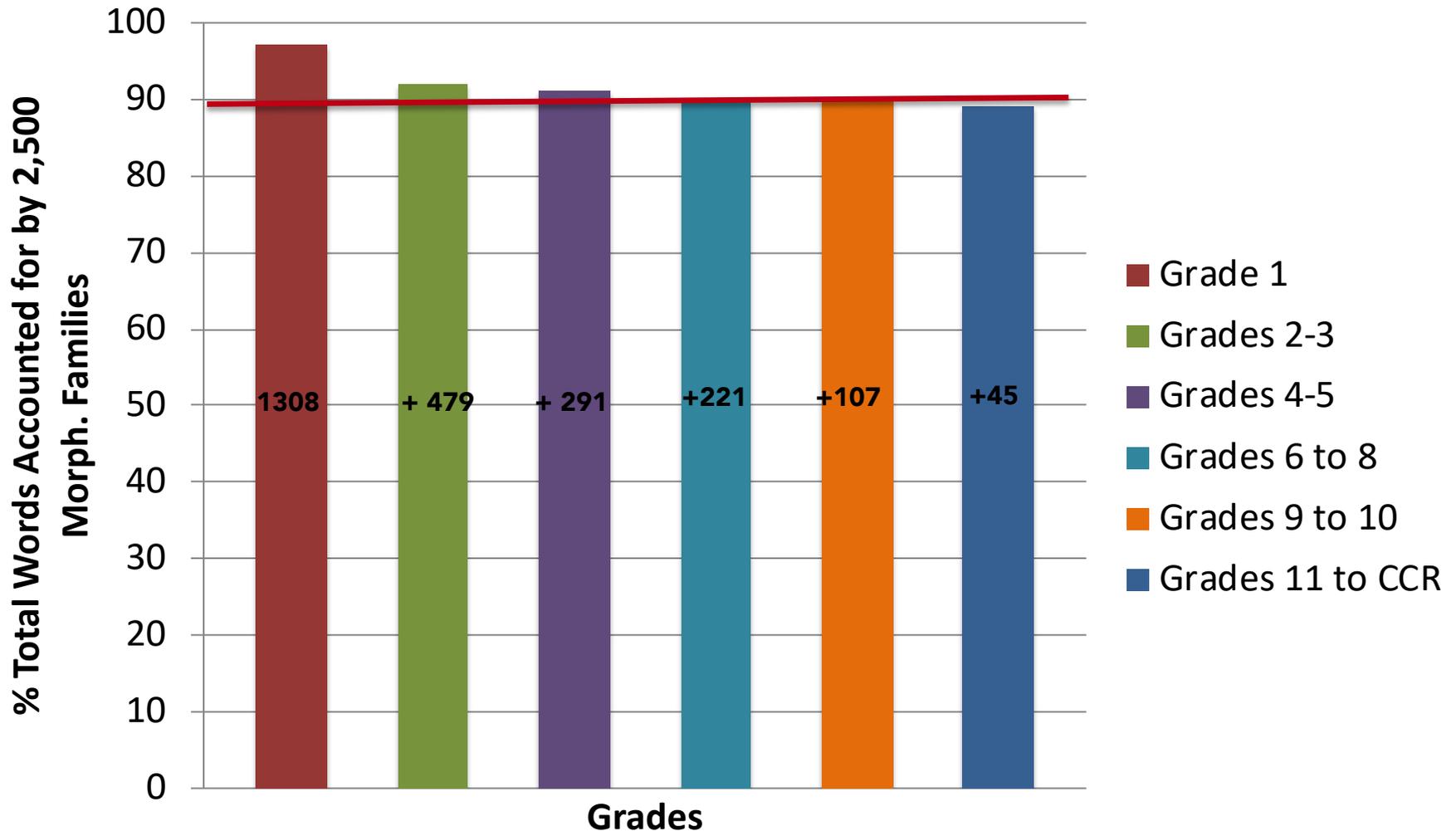
# Distribution of Vocabulary in English

## Lexicon



# Analysis of a Million Word Corpus

(Exemplars from Common Core State Standards)



# Examples of the Words in the Core Vocabulary

	words
1st 100	the, by, through
101-300	long, great, family
301-1,000	power, strong, answer
1,001-1,500	valley, imagine, motion
1,501-2,000	responsible, presence, trail
2001-2,500	discovery, civilization, assume

# 1. Topic Knowledge

## Jobs

- mayor
- boss
- principal

## Health & Human Body

- muscles
- ill
- germs

## Places & Dwellings

- market
- ceiling
- curtains

## Machines

- tools
- motor
- technology

## Animals

- mammals
- frog
- dragon



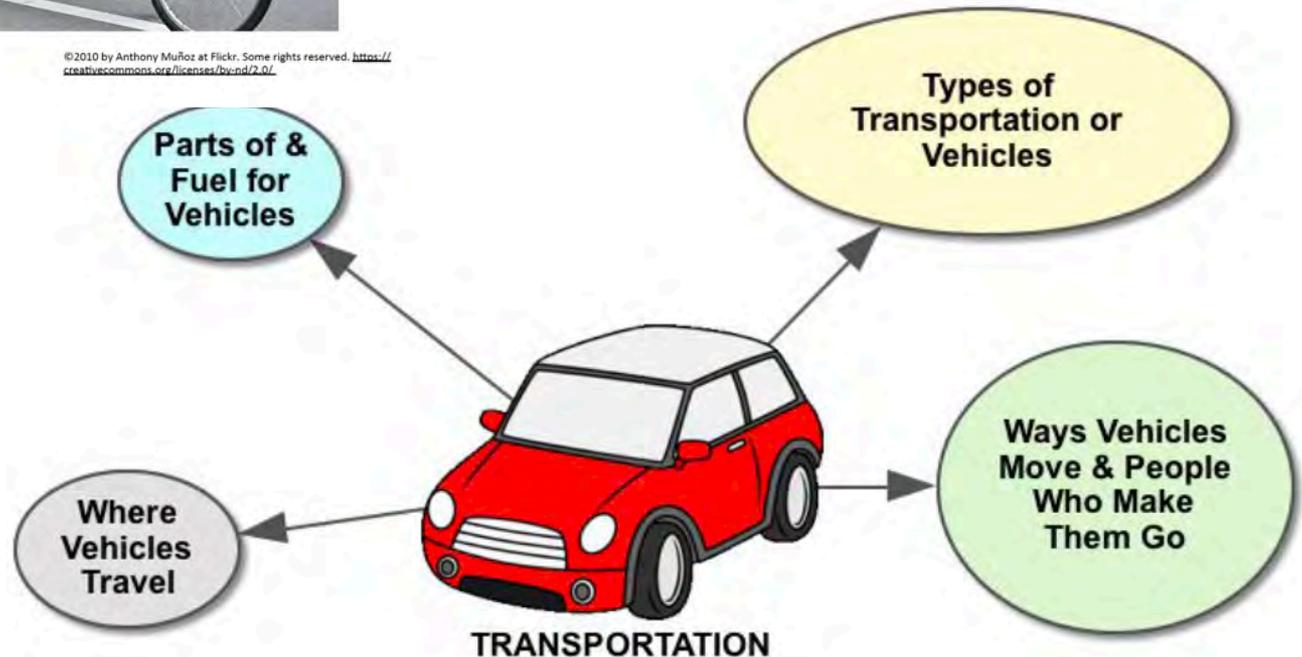
# Transportation— Types of Transportation or Vehicles

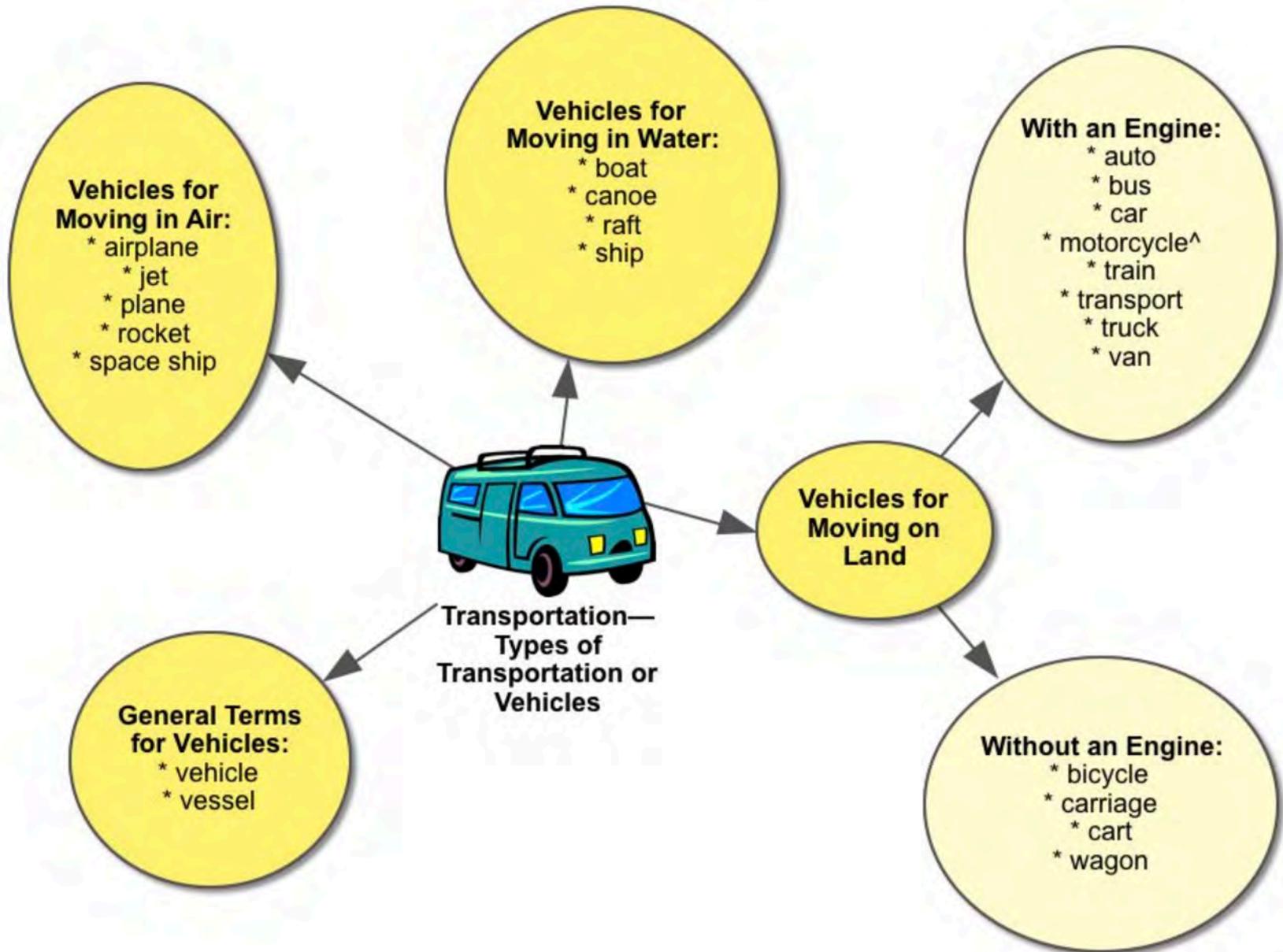


# TextProject provides sets of pictures for core vocabulary

For more information about TextProject, visit [www.textproject.org](http://www.textproject.org)  
v.1.0 © 2014 TextProject, Inc. Some rights reserved  
<http://creativecommons.org/licenses/by-nc-nd/3.0/us/>

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**bus**  
(bus)

# jet (jet)



Photo: Fat Albert, the support aircraft for the US Navy Blue Angels flight demonstration team. August, 2005. Released into public domain by the United States Navy (Blue Angels).

# truck

(truck)



## 2. MORPHOLOGICAL KNOWLEDGE



## 2. Morphological Knowledge

### GREEK/ LATIN

Technical words  
New words by com-  
pounding: **graph, para-  
graph (s), photograph (s),  
telegraph**

### ROMANCE

Most literacy and academic words  
New Words through derivations:  
**separate, separates, separating, separ-  
ated, separation, separately, separable**

### ANGLO-SAXON

Common, everyday, down-to-earth words  
New words through compounding:  
**field (s), airfield (s), battlefield (s), cornfield (s)**

### 3. Multiple Meanings

---

A triangle is a **shape**. A circle and a square are **shapes**, too.

---

Regular exercise helps people get in better **shape**.

---

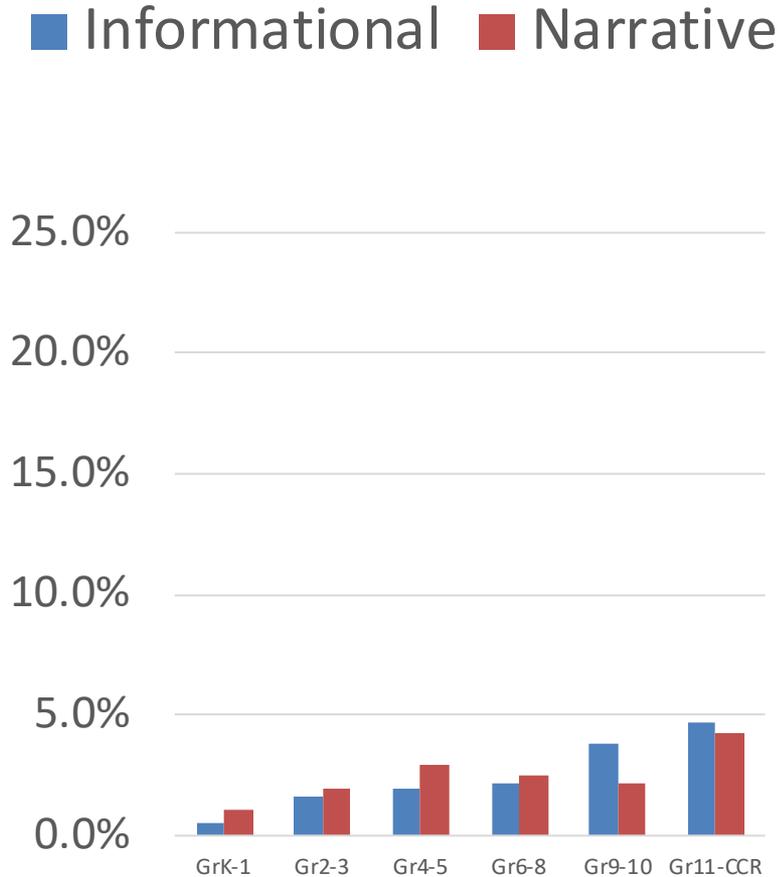
In fact, an idea took **shape** in the jackal's mind right away.

# GPS

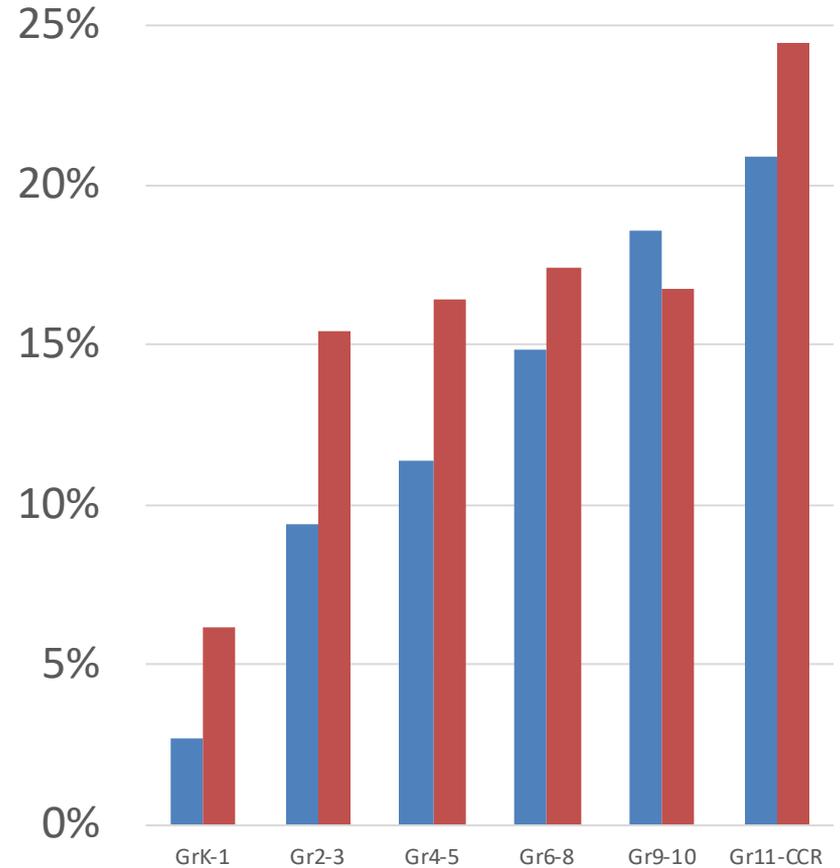
- Every 100 words of text typically has 3-4 rare words, even early on. Rare words are of several types.

# Different Total Rare words (Tokens) and Different Unique Rare Words (Types)

## Tokens



## Types

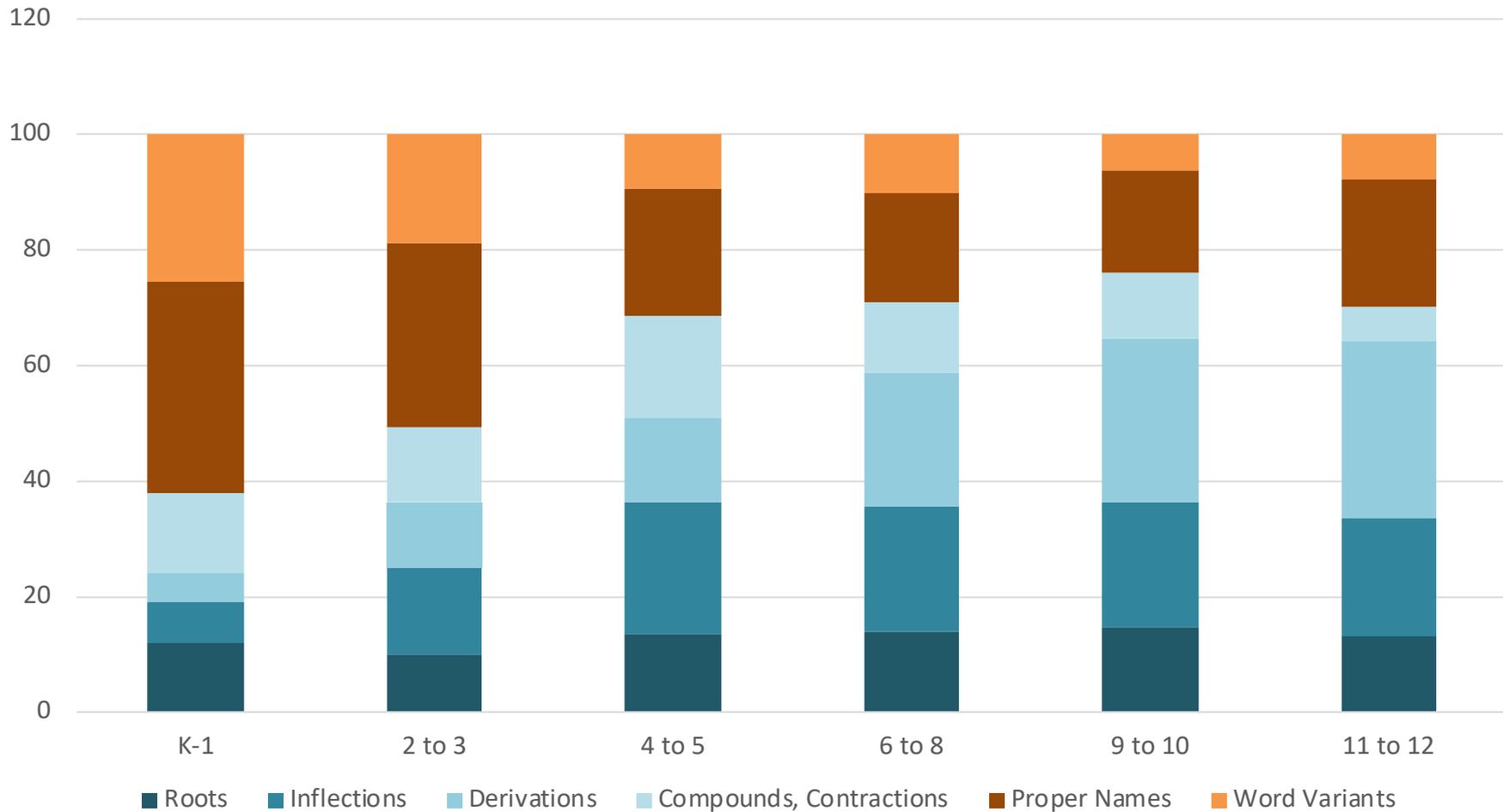


From E.H. Hiebert & A. Pugh (December 2019).

# Features of Words: Grade Bands & Genres (Means)

Grade Band	# Appearances	Word Length	Age of Acquisition (Kuperman, Stadhagen-Gonzalez, & Brysbaert, 2012)	U-function (Zeno et al., 1995)	Concreteness (Brysbaert, Warrinner, & Kuperman, 2014)
2-3	2.6	6.8	9	0.21	3.8
6-8	2.2	7.7	10.5	0.22	3.4
11-CCR	1.9	8.2	11.8	0.21	2.8

# Rare Word Types in Narrative Texts

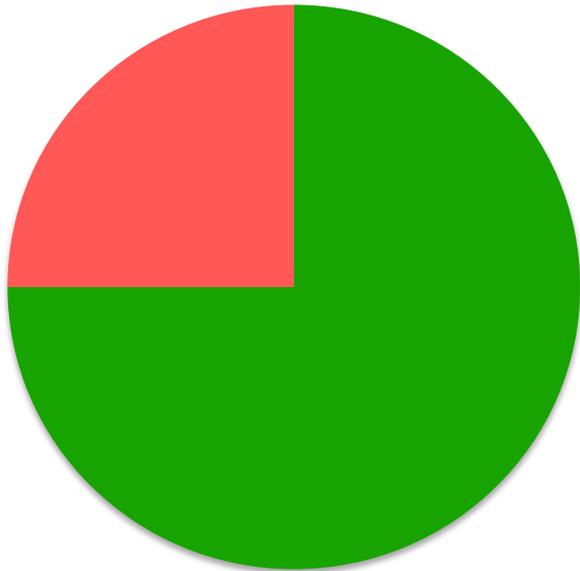


A photograph of three children sitting on a grassy lawn, reading books. In the center, a boy with glasses and a red shirt looks down at a book. To his left, a girl with long dark hair and a pink shirt is also reading. To his right, another girl with long dark hair and a purple shirt is reading. The background is a soft-focus green lawn and trees. A semi-transparent white banner with orange text is overlaid at the bottom.

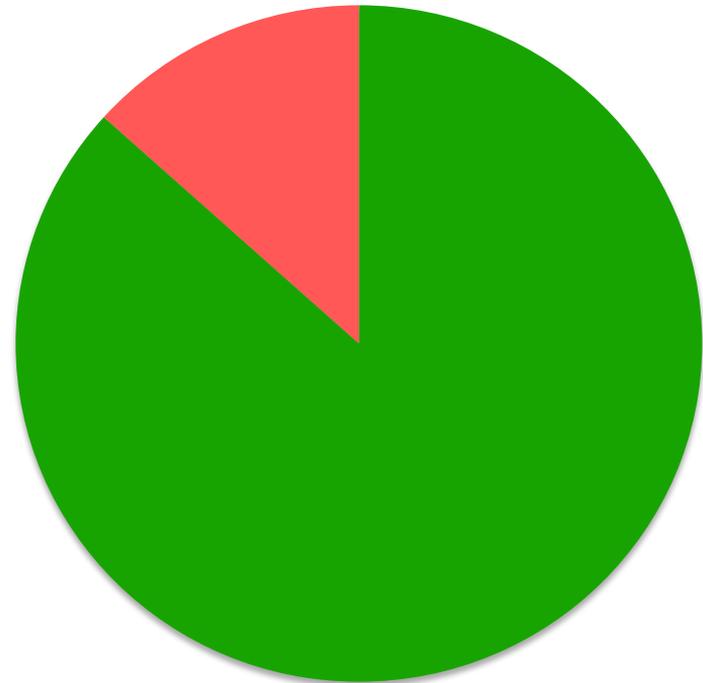
# I. Building students' knowledge through texts

# Time spent reading

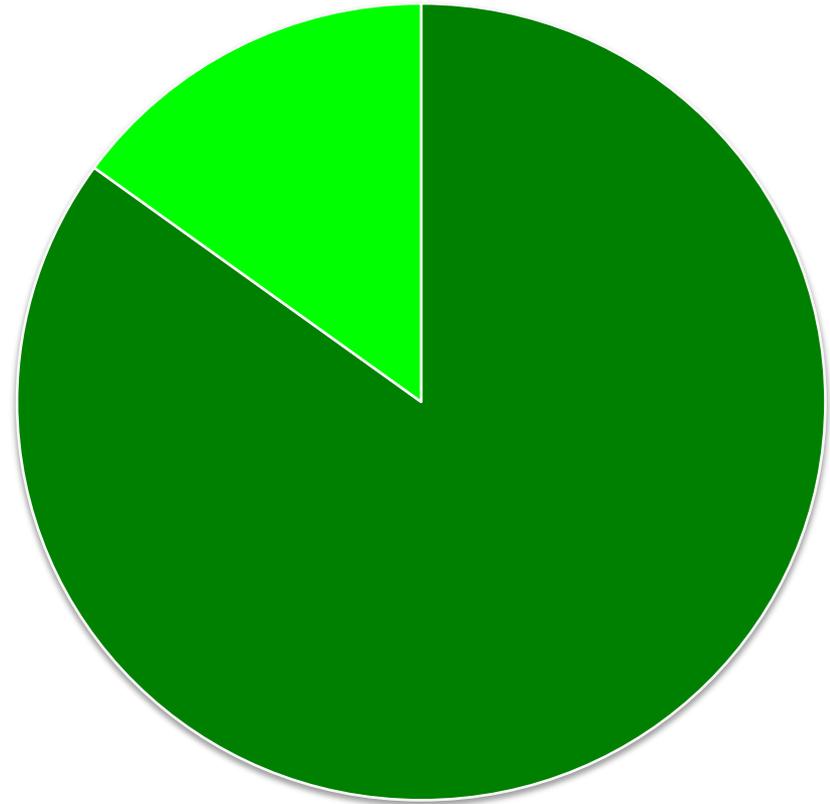
**Reading Instruction (1970s  
to late 1980s)**



**Reading Instruction  
(late 1990s -)**

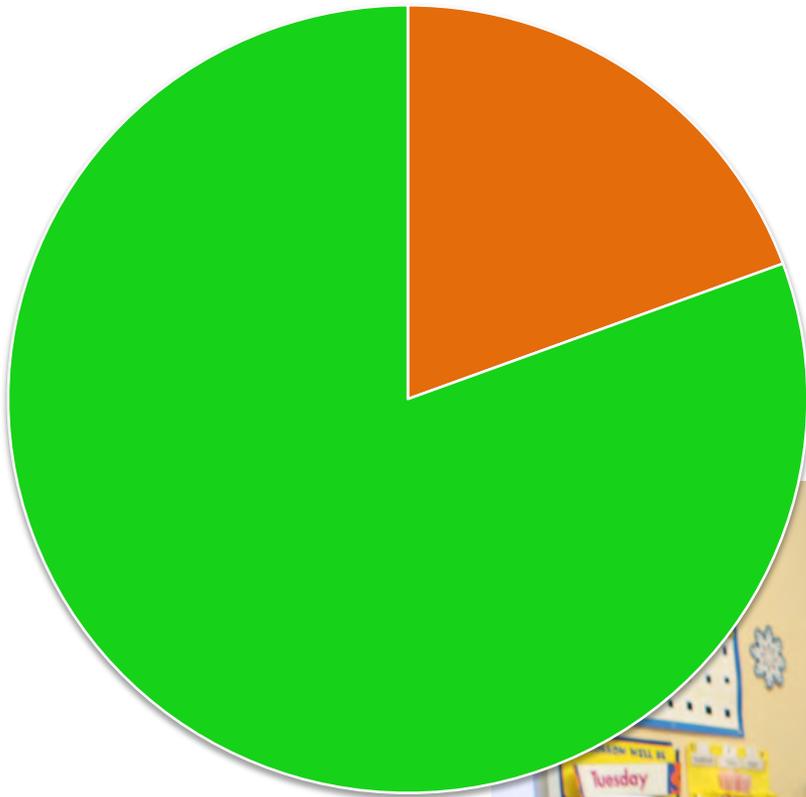


■ Instruction    ■ Time Spent reading



■ Other activities ■ Reading

Swanson, Wanzek, McCulley, Stillman-Spisask, Vaughn, Simmons, Fogarty, & Hairrell, 2015.

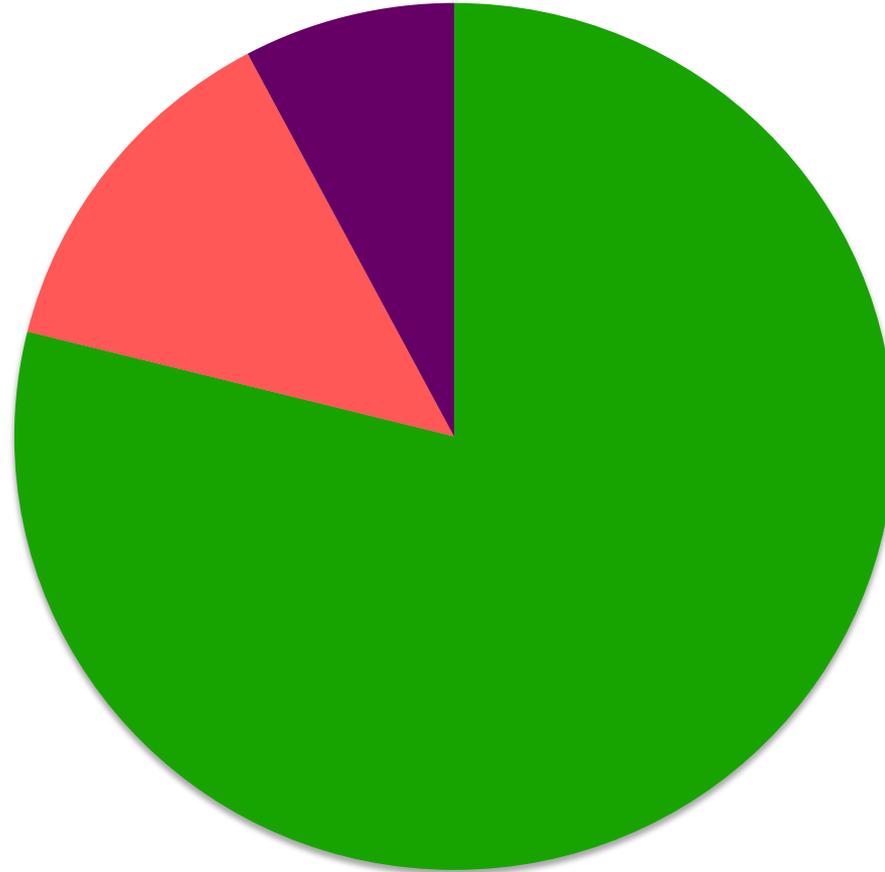


■ Silent Reading

■ Listening, Following Along to Oral Reading



# 7 Minutes of Additional Reading



■ Instruction ■ Time Spent reading ■ Additional 7 minutes

# Texts of a *Typical* Literacy Program\*

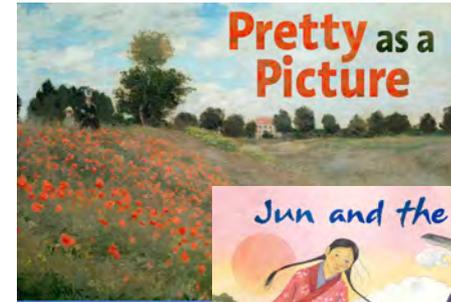
## [Grade 2]



\*Texts from Leveled Literacy Intervention, Heinemann

# Texts of a *Knowledge* Literacy Program\*

[Grade 2]



\*Texts from W.O.R.D., Scholastic

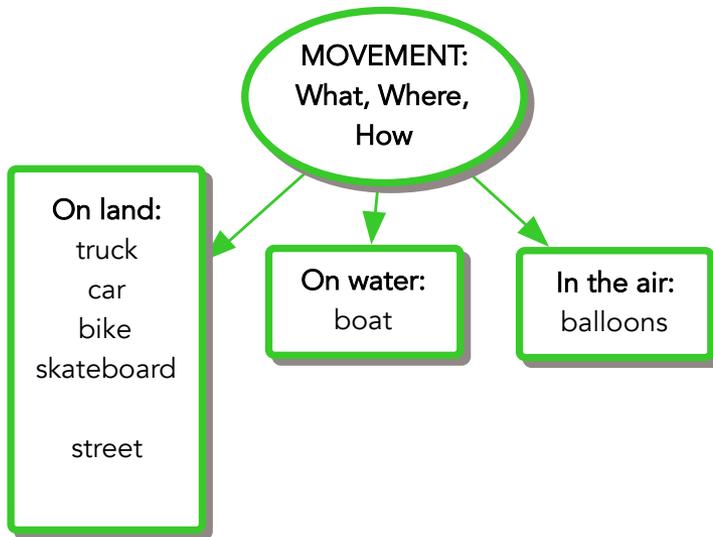
# Comparison of Two Text Types

(# of words in each: 11,400)

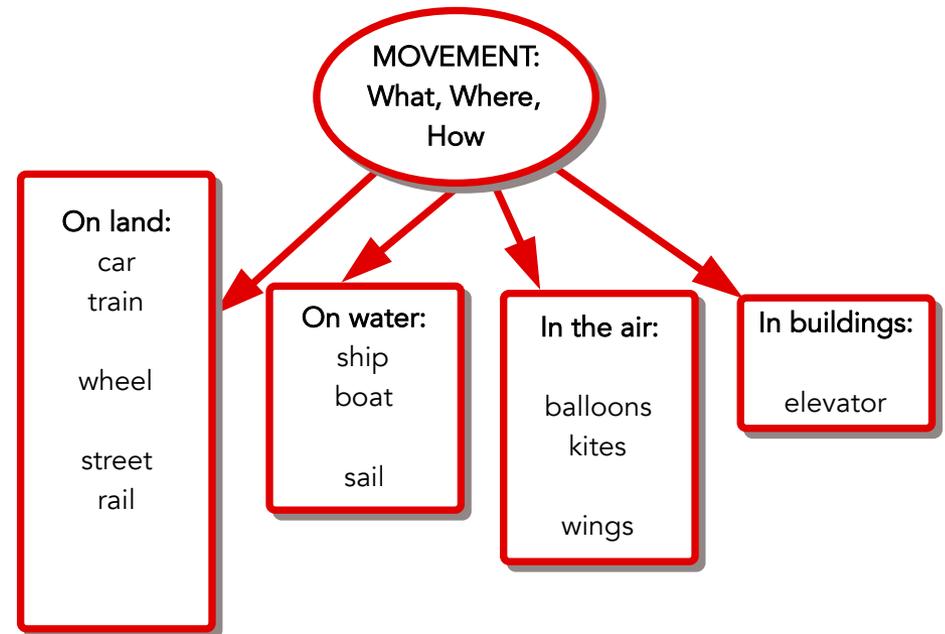
	Typical	Knowledge-Based
# unique words	1,718	1,332
# word families with more than one family member	225	501
% words outside 2,500 Word Families	6%	4%

# Size of Critical Semantic Clusters (words with 3+ repetitions)

## Typical Program

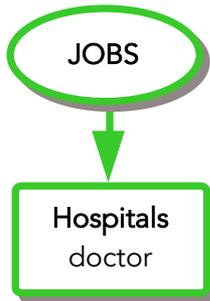


## Knowledge-Based Program

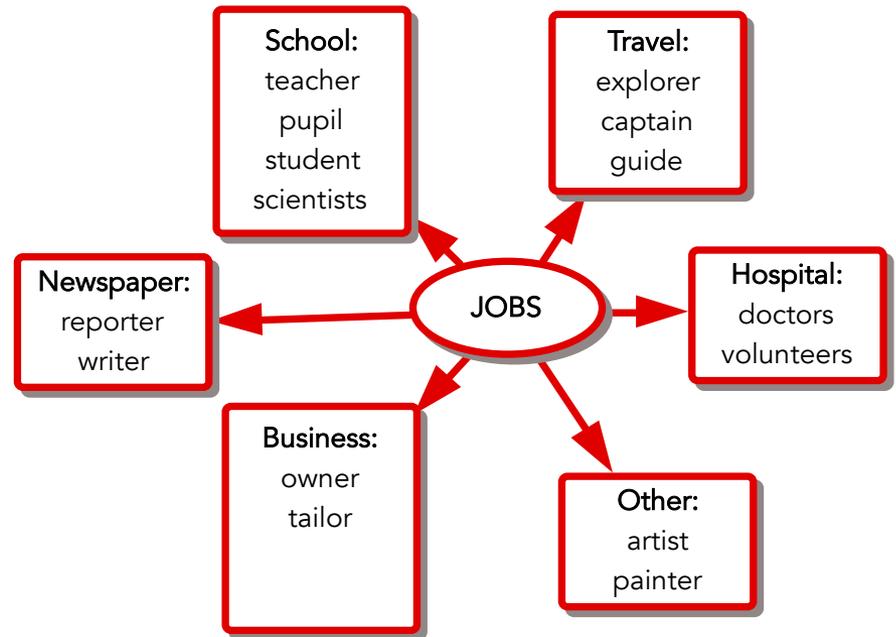


# Size of Critical Semantic Clusters (words with 3+ repetitions)

## Typical Program



## Knowledge-Based Program



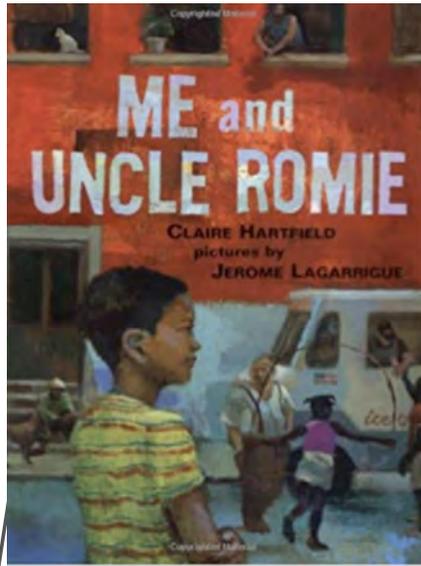
## 2. Lessons on How Words Work



# Narrative Text

Even with eyes protected by the green spectacles, Dorothy and her friends were at first dazzled by the brilliancy of the wonderful City. The streets were lined with beautiful houses all built of green marble and studded everywhere with sparkling emeralds. They walked over a pavement of the same green marble, and where the blocks were joined together were rows of emeralds, set closely, and glittering in the brightness of the sun. The window panes were of green glass; even the sky above the City had a green tint, and the rays of the sun were green.

From *The Wonderful Wizard of Oz* (Frank Baum)

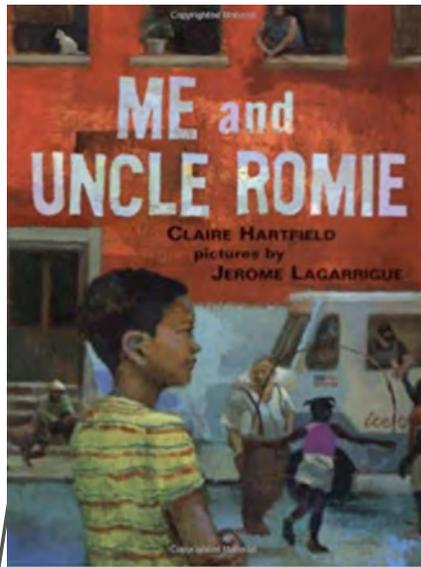


*Me and Uncle Romie:*  
compound words

- skyscrapers
- workroom
- cardboard
- underground
  - doorway
  - stickball
- bald-headed
- home run

- photographers
- subway

- train schedule
- fire escapes
- pepper jelly
- fierce-eyed
- postcards



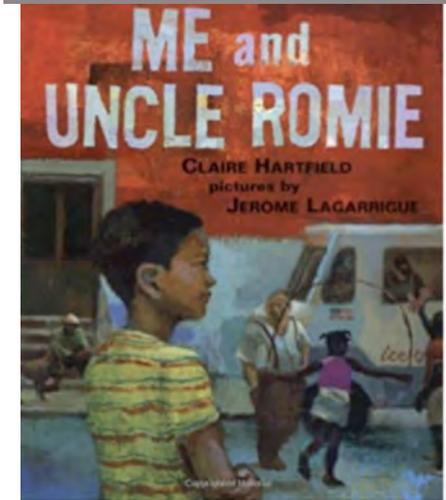
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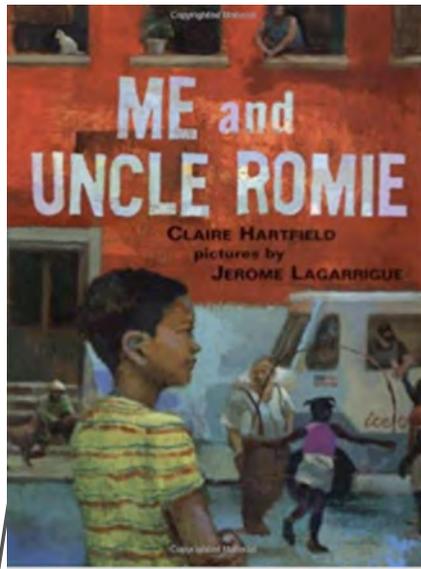
- photographers
- subway

Penn Station  
Harlem  
Statue of Liberty  
Carolina  
Caribbean  
Chicago



*Me and Uncle Romie:*  
Places

avenue    ferry  
hydrant    stoops  
bleachers    platform  
skyscrapers    studio  
neighborhood  
underground



*Me and Uncle Romie:*  
compound words

- skyscrapers
- workroom
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- doorway
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- bald-headed
- home run

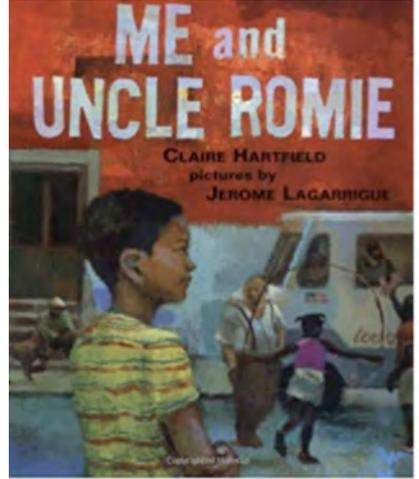
- train schedule
- fire escapes
- pepper jelly
- fierce-eyed
- postcards

- ruined
- feast
- model
- concerned
- schedule
- yanked
- streak
- smear
- glorious
- studio

- photographers
- subway

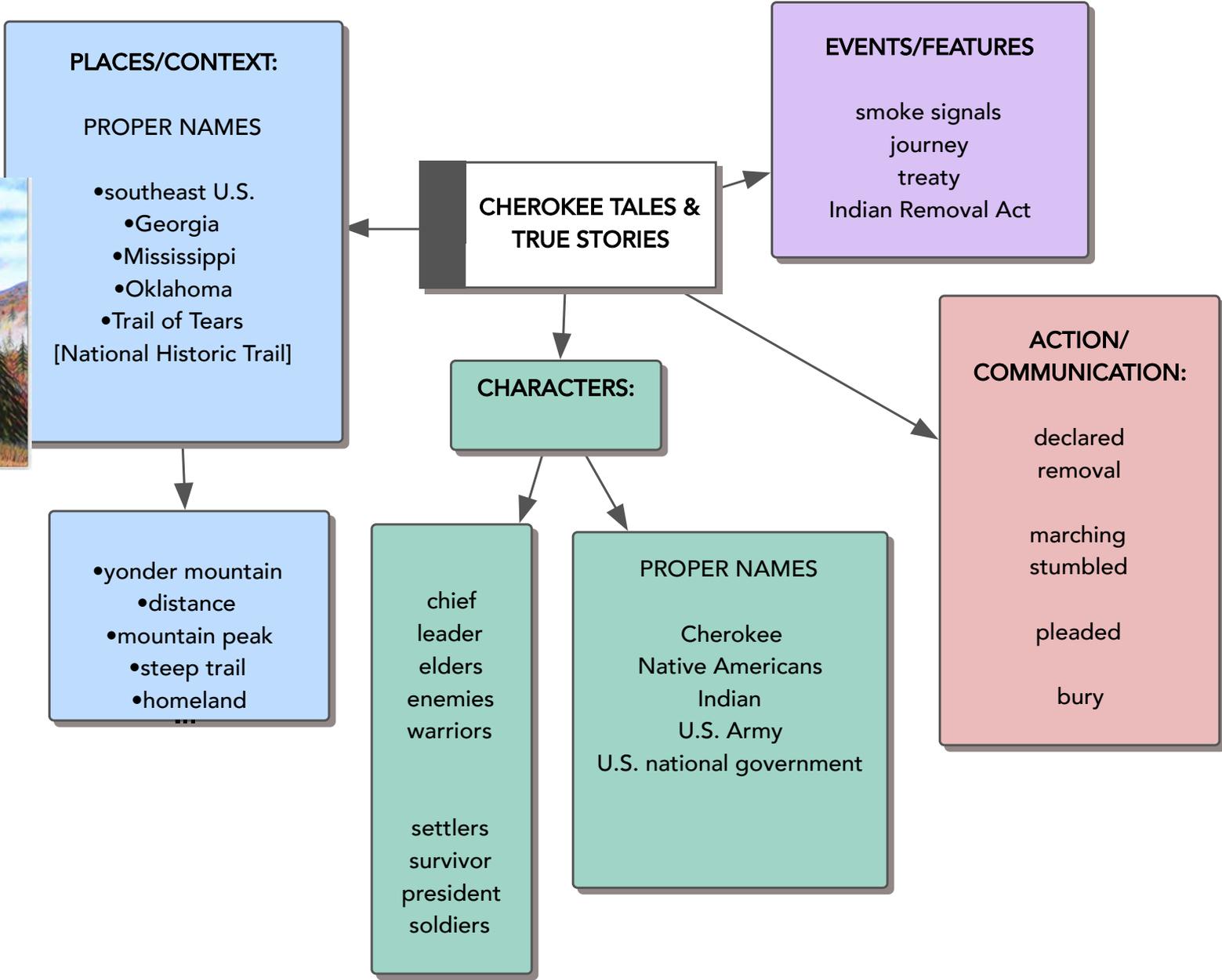
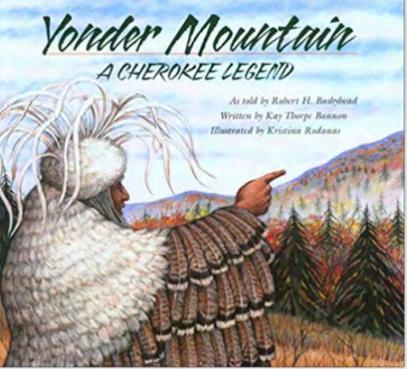
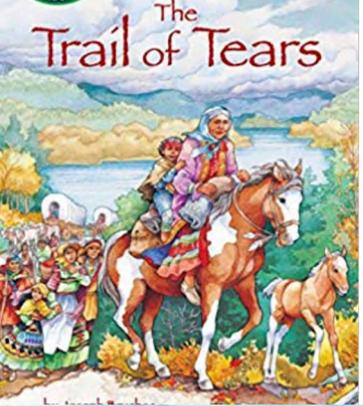
- ruined
- feast
- cardboard
- fierce
- flights
- pitcher
- treasure
- stoops

- Penn Station
- Harlem
- Statue of Liberty
- Carolina
- Caribbean
- Chicago



*Me and Uncle Romie:*  
Places

- avenue
- ferry
- hydrant
- stoops
- bleachers
- platform
- skyscrapers
- studio
- neighborhood
- underground



### **3. Conversations About the Core Vocabulary and Students' Capacity with it**



## Grade 3 (Narrative)

Mrs. Snavin looked at the screen, and then she looked at this book, and then back at the screen again. Then she shook her head and let out this big sigh. I could tell she was almost ready to call Mrs. Reed.

I've always liked computers, and I know how to do some stuff with them. Like turn them on and open programs, play games and type, make drawings, and build Web pages, things like that. So I got up from my desk, pointed at the screen, and said, "Mrs. Snavin, if you double-click on that little thing right there, then the program will start running. about number lines."

## Grade 3 (Expository)

It looks like a bear, but it's not even related to a bear. It's a koala. This little animal is related to a group of animals that includes the kangaroo. It lives in the wild in only one place in the world, the East Coast of Australia. Koalas remind people of teddy bears. They have thick fur and large fluffy ears. Their broad flat nose makes them look "cuddly," similar to a gray and white teddy bear. Koalas aren't cuddly though. They have sharp teeth and very sharp claws! Koalas are marsupials. This means the mother carries her baby in a pouch while it develops,

# GPS

- Humankind's knowledge is stored in text. From the start, we read to learn—both stories and information.
- Words are the labels for concepts that underlie knowledge. 2,500 word families account for the majority of words in texts. These families represent major bodies of knowledge & English's linguistic systems.
- Every 100 words of text typically has 3-4 rare words, even early on. Rare words are of several types.
- Students who depend on schools to become highly literate need ELA instruction that focuses on world and word knowledge.



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