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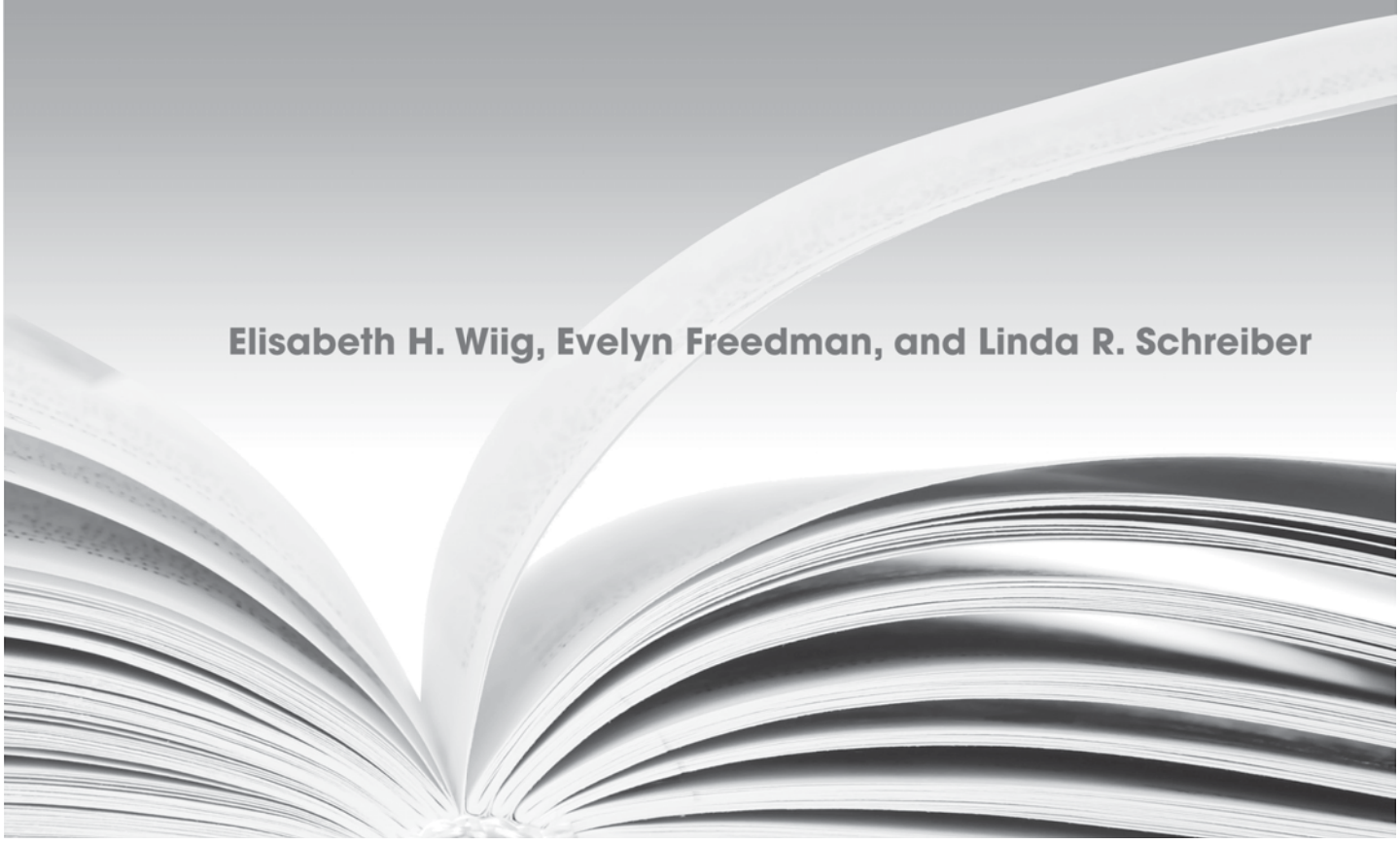
THE WORD BOOK

Learning Words through Meaningful Connections

Elisabeth H. Wiig, Evelyn Freedman, and Linda R. Schreiber



The Word Book

by Elisabeth H. Wiig, Evelyn Freedman, and Linda R. Schreiber

Graphic Design by Debra Olson

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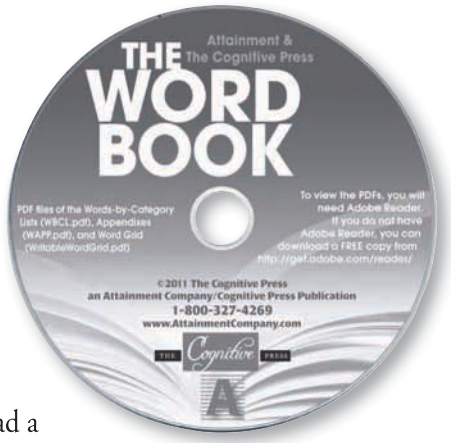
The Word Book CD

Also included with this book is a CD containing PDF files of the Words-by-Category Lists (WBCL.pdf)—for easy word searches—and the Appendixes (WAPP.pdf)—for convenient printing from your computer. You will also find a writable Word Grid (WordGrid.pdf) for your use.

To view the PDFs, you will need Adobe Reader.

If you do not have Adobe Reader, you can download a copy for FREE from http://get.adobe.com/reader/



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Contents

Preface

This is the second edition of *The Word Book.* It doesn't deviate from the intent of the first edition, which arose from collaboration between two professions and methodologies (speech-language pathology and classroom teaching). The focal premise of *The Word Book* is that oral language is the key to development of a student's ability to communicate, to learn and understand "how the world works," and to build new vocabulary from the foundations of prior knowledge. In an effort to help students be successful at school, at home, and in the community, this foundation needs to be in place. Vygotsky (1986) said that vocabulary and words reflect concepts. The vocabulary listed and categorized in this book identifies the essential or fundamental concepts and knowledge students need as they emerge from elementary school and progress to higher grades and beyond.

It is the ability to categorize that transitions brain functioning from concrete and isolated words and ideas to the abstractions and generalizations that are assumed to be intact by middle and high school teachers. All students can benefit from this dual focus of teaching of concepts and vocabulary by a process involving categorization. Hopefully, *The Word Book* will assist and guide speech-language pathologists, special educators, and teachers in a way of teaching that helps every student reach his or her greatest potential.

We owe a debt of gratitude to the members of the Scarborough Board of Education, Ontario, Canada, for the support they gave during the development, field testing, and implementation phases of the initial project. The students also deserve our thanks for their contributions in the teaching-learning interactions.

Our families deserve our thanks too. They supported us with finances and with time off for developing the program and the resource.

Last, but not least, we acknowledge the "gifts" of collaboration among us. They were many and will be remembered with fondness.

Overview

What Is *The Word Book?*

The Word Book: Learning Words Through Meaningful Connections is a teaching resource to help you improve your students' vocabulary knowledge—the words they must know to communicate and learn effectively. Helping students develop vocabulary is more than just having them identify or define words. Developing students' vocabulary knowledge is about helping them build word meaning and the ideas and concepts words represent. It's about helping students use new vocabulary in their receptive and expressive language. This is the purpose of *The Word Book.*

The Word Book is based on theories of semantic relations (e.g., Cruse, 1986, 2000; Fillmore 1976, 1985; Jakobson, 1984), which means it focuses on strategies for categorizing words and relating new words to other words. Establishing these relationships aids retrieval and future use of the terms. *The Word Book* includes word lists of essential and fundamental concepts and associated vocabulary that a student in middle school or high school is expected to know. The lists model the categorization and semantic relationships among words that might comprise the focus of a classroom vocabulary lesson. Thus instruction of target vocabulary can be aligned with academic curriculum.

Vocabulary is not a natural ability like aptitude, it can be improved. Surprisingly, educators give minor attention in school to vocabulary development.

In addition to the word lists, strategies for direct teaching of vocabulary and concepts are outlined with a discussion of ways to plan lessons around the conceptual and semantic categories. Educators will find this resource useful in their lessons designed to directly teach vocabulary; it will help students make connections and integrate words they will need to be successful in understanding and communicating their knowledge of classroom content.

Users

The Word Book is designed to help students in grades 5 through secondary grades and beyond advance their development of meaningful vocabulary. Information in *The Word Book* is applicable to **all** students but especially to those students whose vocabulary is not as developed as should serve them for academic and life successes. This population of students—who are disadvantaged because of poorly developed vocabulary—could include students with language disorders, learning disabilities, Asperger syndrome, autism, attention-deficit/hyperactivity disorder, mild-to-moderate intellectual disabilities, and students who have grown up in linguistically "poor" environments.

Classroom teachers, speech-language pathologists, learning disabilities teachers, special education teachers, reading specialists, Title I teachers, etc., will find *The Word Book* helpful. Those special educators who collaborate in inclusive settings will find *The Word Book* invaluable and preplanning a classroom lesson to focus on specific vocabulary will be easy. Educators who work with individuals one-on-one or in small groups will also find *The Word Book* helpful because vocabulary can be pretaught to students to develop the prior knowledge needed to be successful in classroom activities.

Why Is Vocabulary Development So Important?

The literature is replete with studies that support the importance of vocabulary knowledge for success in speaking, listening, reading, and writing. An adequate vocabulary influences children's potential for learning, and the Johnson O'Connor Research Foundation (a nonprofit agency dedicated to developing potential in individuals) reported that among their clients, those with larger vocabularies earned more over their lifetimes than those with less-developed vocabularies.

Vocabulary and Reading

All our words are but crumbs that fall down from the feast of the mind.

Kahlil Gibran

The interaction of vocabulary development and reading is well-documented. A long-established link exists between vocabulary knowledge and learning to read (Snow, Burns, & Griffin, 1998). When a child doesn't understand a word, it is extremely difficult to sound it out (Cunningham, 2007). In fact, vocabulary is the greatest predictor of reading comprehension (Dickinson and Neuman, 2006) and overall reading achievement (Cunningham & Stanovich, 1997; Stanovich, 2000). Catts, Fey, Zhang, & Tomblin (1999) found that children's vocabulary in the early grades is predictive of reading comprehension in the upper grades and Cunningham & Stanovich discovered that first-grade vocabulary was predictive of reading comprehension 10 years later. Baker, Simmons, & Kame´enui (1998) also found that students who excelled in reading comprehension had larger receptive and expressive vocabularies than students whose reading comprehension is average and that students who underachieve in reading tended to have poor vocabularies, both receptively and expressively. The National Reading Panel Report (National Institute of Child Health and Human Development, 2000) lists vocabulary development as one of five components crucial for an effective literacy program.

Vocabulary, Intelligence, and Achievement

Beck, McKeown, and Kucan (2002, 2008) suggest that vocabulary is the hallmark of an educated person and other researchers suggests that vocabulary is predictive of overall achievement in school (Alexander, Entwisle, & Horsey, 1997; Anderson & Nagy, 1992). There is no question that the size of person's vocabulary predicts how well they will understand what they have read, how successful they will be in school, and how well they will achieve later in life. People can have many aptitudes, but without a large and precise English vocabulary to express themselves, they cannot take full advantage of these abilities (Johnson O'Connor Research Foundation, 2010).

As students advance in each grade, to understand curriculum content they must acquire at least 3,000 new words (about 10-15 new words per day) to keep up (Cunningham, 2007; Graves, 2006).

Vocabulary is *not* a natural ability like aptitude, but it can be improved. Surprisingly though, as educators, we give minor attention in school to vocabulary development (Beck, McKeown, & Kucan, 2002, 2008; Biemiller, 1999; Blachowicz, Fisher, Ogle, & Watts-Taffe, 2006) and we sometimes forget that vocabulary acquisition is complicated and life-long and requires explicit instruction.

Instruction Aligned to Standards

In addition to solid research implicating the value of a strong lexicon, federal laws such as the No Child Left Behind Act (2001) hold school districts accountable for the progress of all students, including those with disabilities. This mandate requires assessment of students' progress in meeting national, state, and local academic standards. Consequently, the instruction of all students must be aligned to established standards. The National Council of Teachers of English (NCTE) in collaboration with the International Reading Association (IRA; NCTE/IRA, 2009) propose the Language Arts standards related to students' acquisition of and use of vocabulary. The standards are listed in Figure 1.

Figure 1

NCTE and IRA Proposed Language Arts Standards Related to Vocabulary

Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).

Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.

Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.

Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

Source: NCTE/IRA (2009)

Nearly all state and local standards follow the framework of these national standards. *The Word Book* is written to assist you in aligning your teaching of vocabulary to these standards.

What We Know about How Vocabulary Develops

Vocabulary Growth

Interestingly, we often think of and assess vocabulary as either expressive (production) or receptive (comprehension). However, Graves (2006) identifies four types of vocabularies:

1. **receptive-oral vocabulary**—the words we hear and understand;
2. **receptive-written vocabulary**—the words we read and comprehend;
3. **productive-oral vocabulary**—the words we use in our speech and conversations; and
4. **productive-written vocabulary**—the words we use when we write.

The words children hear as they grow help them make sense of words they eventually will speak, read, and write. Fisher and Frey (2008) estimate that by third grade, students know about 30,000 words. Four hundred of those words might be directly taught by teachers but since everyday conversation contains 5000 to 7000 words, younger children learn the majority of new words via conversations. By age 10, however, conversation is no longer the primary source of vocabulary growth and children begin to learn additional new words via reading.

At age 4, children from professional families have 1100 words, children from working class families have 700 words, and children from less economically advantaged families have 500 words (Hart and Risely, 1995).

Other estimates of the size of students' vocabulary knowledge vary. The following points summarize what is known about vocabulary learning and are interesting to ponder:

- Children enter kindergarten with approximately 5,000 words in their oral vocabularies (Cunningham, 2007).
- As students advance in each grade, to understand curriculum content, they must acquire at least 3,000 new words to keep up (Cunningham, 2007; Graves, 2006).
- Average 12th graders know 50,000 words families (Graves, 2006).
- Printed school English (including proper nouns, multiple meanings of words, and idioms) contains 180,000 word families (Anderson & Nagy, 1992).
- There are over 450,000 words in the English language (Montgomery, 2008).

The finest words in the world are only vain sounds, if you cannot comprehend them.

Anatole France

- Children who were the high achievers in reading and math at age 10 were students who had heard 45 million words in their early years (birth to 3), or 30,000 words per day; the lowest achievers heard 13 million words in their first three years of life (Hart & Risely, 1995).

- Children enter school with varying levels of vocabulary development. At age 4, children from professional families have 1100 words, children from working class families have 700 words, and children from less economically advantaged families have 500 words (Hart and Risely, 1995).

- The number of words children learn varies from 2 versus 8 words per day; 750 versus 3000 words per year (Archer, 2009).

- By the end of second grade, there can be a 4000-word difference in root vocabulary between struggling achievers and high achievers (Hart & Risely, 1995) and the gap continues to grow as students advance through the grades (Cunningham & Stanovich, 1997).

- The words children find in their classroom textbooks are the ones that will be on the SAT or ACT test they take in the future. A college-bound student who scores in the average range on the verbal portion of the SAT knows about 45,000 words and above average student knows approximately 100,000 words (Cunningham, 2007).

Even with older students, concepts and vocabulary can be developed through direct instruction (Bruner, 1973; Feuerstein, 1981; Vygotsky, 1986). Although vocabulary growth slows in adulthood, it is an area of communication that continues to grow and develop throughout one's life.

Based on the above points, you might conclude there are far too many words to teach. However, it is possible to choose appropriate and relevant words to help students develop vocabulary (this is discussed beginning on page 12). To close the gap that occurs between high achievers and low achievers, vocabulary development can and should be a focus in classroom content areas and promoted through direct and explicit instruction.

How Vocabulary Is Learned

Vocabulary is acquired in an ongoing learning process. Words are learned indirectly via exposure (by hearing/listening/being read to/reading) and directly (through structured, explicit instruction; repeated opportunities; and word learning strategies; Cunningham, 2007; Montgomery, 2008). Beck, McKeown, and Kucan (2002) suggest there are five levels of knowing what a word means:

1. no knowledge of a word's meaning
2. a general sense of a word's meaning
3. narrow context-bound knowledge of a word's meaning
4. knowledge of a word's meaning but unable to recall the word readily enough to use it appropriately
5. rich, decontextualized knowledge of a word's meaning, how the word relates to other words, and how it can extend to other uses

Words mean more than what is set down on paper. It takes the human voice to infuse them with deeper meaning.

Maya Angelou

Bromley (2004) suggests a model of how children learn vocabulary and come to "own" words. See page 17.

Graphic Organizers for Creating Semantic Networks

The following graphic organizers can help establish meaningful semantic relationships by visually representing connections among concepts and terms. Each serves varying purposes. Examples of use are provided here and blanks are provided in the Appendixes.

KWL Chart

A *KWL Chart* is easy to use and can be used to determine students' prior knowledge of a concept or vocabulary. It can also be used to measure progress in learning and using new concepts and terms.

Purpose:

- Used to determine students' prior knowledge of a concept or vocabulary
- Used to measure progress in learning and using new concepts and terms

Directions:

Have students write the new concept or term on the line at the top of the page. Have them complete the first two columns before beginning the lesson. At the completion of the lesson, tell students to finish the *KWL Chart* by telling what they have learned and how they will use the new information.

KWL Chart

Name:_____ Date:_____

Concept or Word: Directions

What I Know	What I Want to Know	What I Learned
north south east west	What do they mean? How do you read a compass?	Can always find north with a compass or iPhone. Can always find the rest when you find north. Sun sets in west always. Sun comes up in east always. Going any direction NSEW depends on referent points.

How I will apply what I learned to home, school, and community:

Now I can read/give directions without using left and right, more precise when I am going somewhere.

Venn Diagram

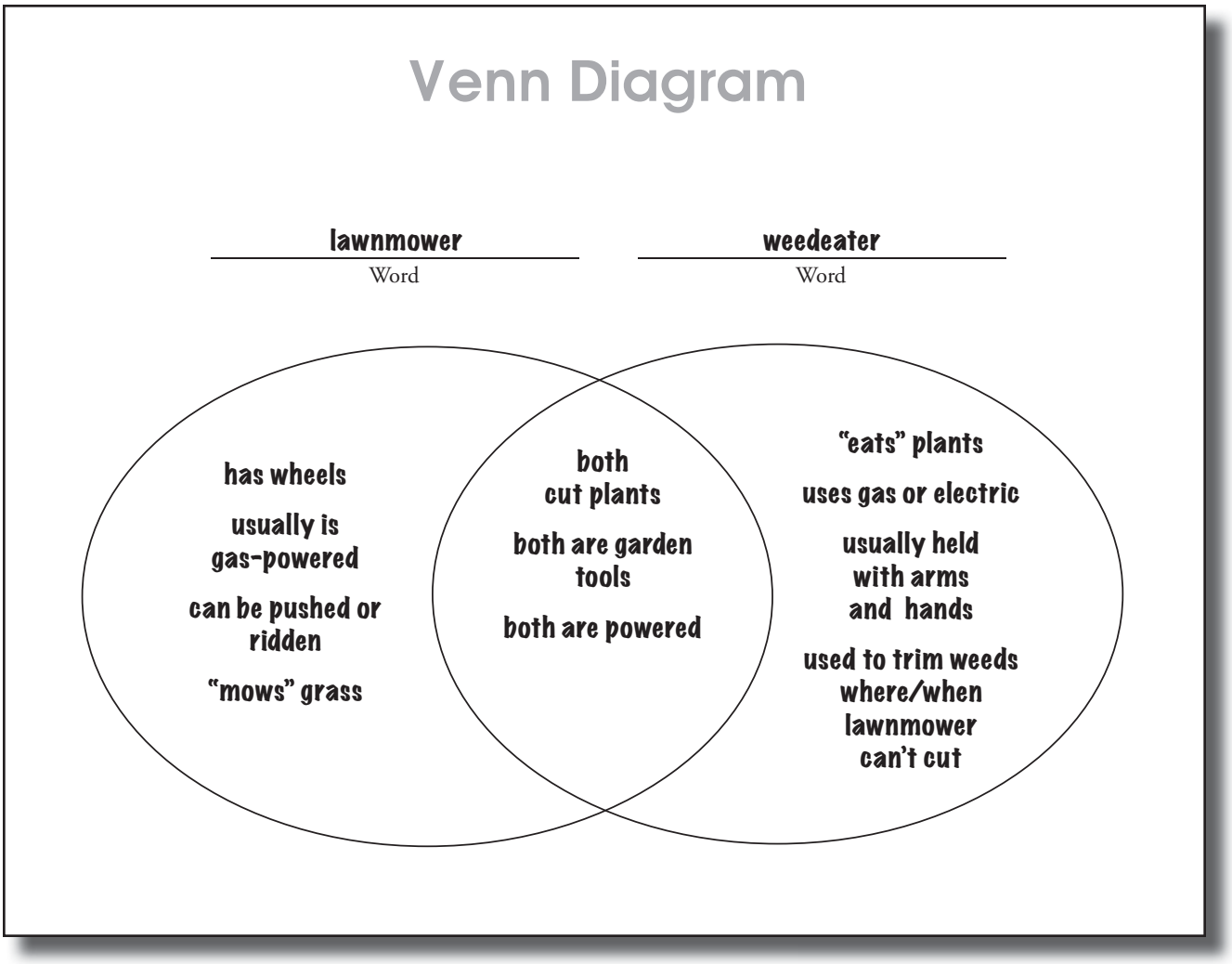
Students need to add new words to their repertoire but they also need to enrich the meanings of words they already know (Johnston, 2006). *Venn Diagrams* are useful for both purposes. This example answers the questions: How is a lawnmower different from a weed eater? How are they the same? This particular exercise was used to enrich words already in the student's repertoire.

Purpose:

- Used to add new words to a student's repertoire
- Used to enrich the meanings of words students already know
- Used to compare and contrast terms or concepts

Directions:

Have students write the two concepts or terms on the lines above each circle. Then tell students to write the differences between the two items in the circles below the words. End by writing a few similarities in the overlapping area.



Features Web

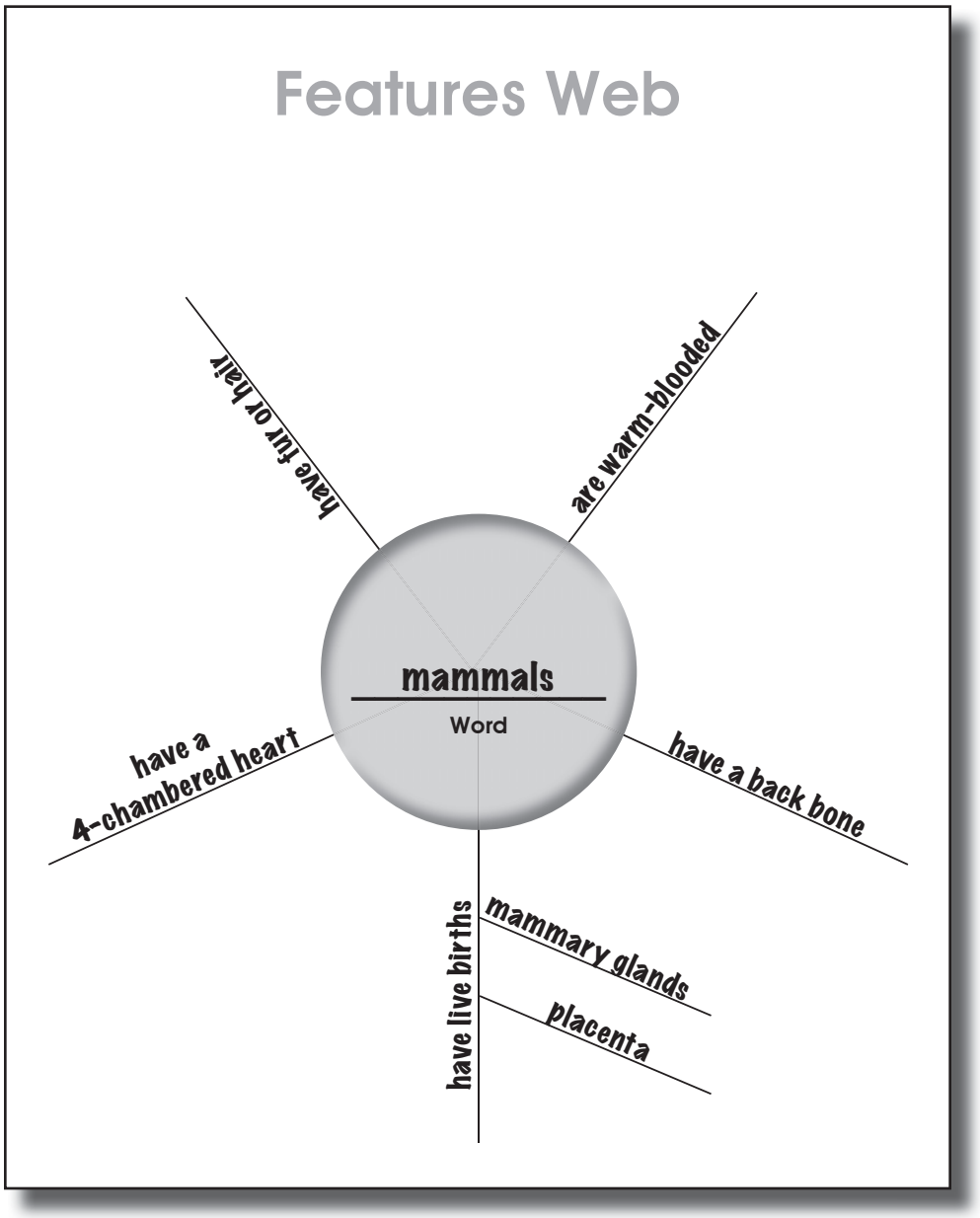
Words or concepts can be represented by a set of defining attributes or semantic features. McGregor, Newman, Reilly, & Capone (2002) discovered that students can add features to word meanings by comparing and contrasting the features.

Purpose:

- Used to narrow a student's knowledge of a word by discovering the features that comprise it
- Used to compare the features of two words (by comparing individual Features Webs)

Directions:

Be certain students know the term *feature* or *attribute* or *characteristic.* Write the target word or concept in the center circle. Then write features on the lines coming from the circle. Lines can also be drawn from the features listed to narrow the descriptions further.



Examples or Not?

Having students generate examples and nonexamples is a way for them to apply what they know about the features of a word. If the features, attributes, or characteristics are understand, the student should be able to generate examples and nonexamples.

Purpose:

- Used to broaden a student's knowledge of a word using other words that share its features

Directions:

Have students write the new vocabulary or concept on the line at the top of the organizer, then list examples and nonexamples. If they have difficulties with this exercise, they might first complete an attribute web since the attributes will help them decide if a word is an example or not.

Examples or Not?

Word: mammal

Examples	NOT Examples
cow	emu
dog	ostrich
pig	bee
cat	salmon
whale	hornet
camel	jellyfish
tiger	
bat	
rabbit	
seals	

Semantic Map

Words in one's vocabulary need to be categorized, classified, and stored in memory for effective use. Word finding and word retrieval, two aspects of vocabulary use, become easier when related words are stored in an organized way so that meaningful associations among words can be created. A *Semantic Web* can help students see the connections.

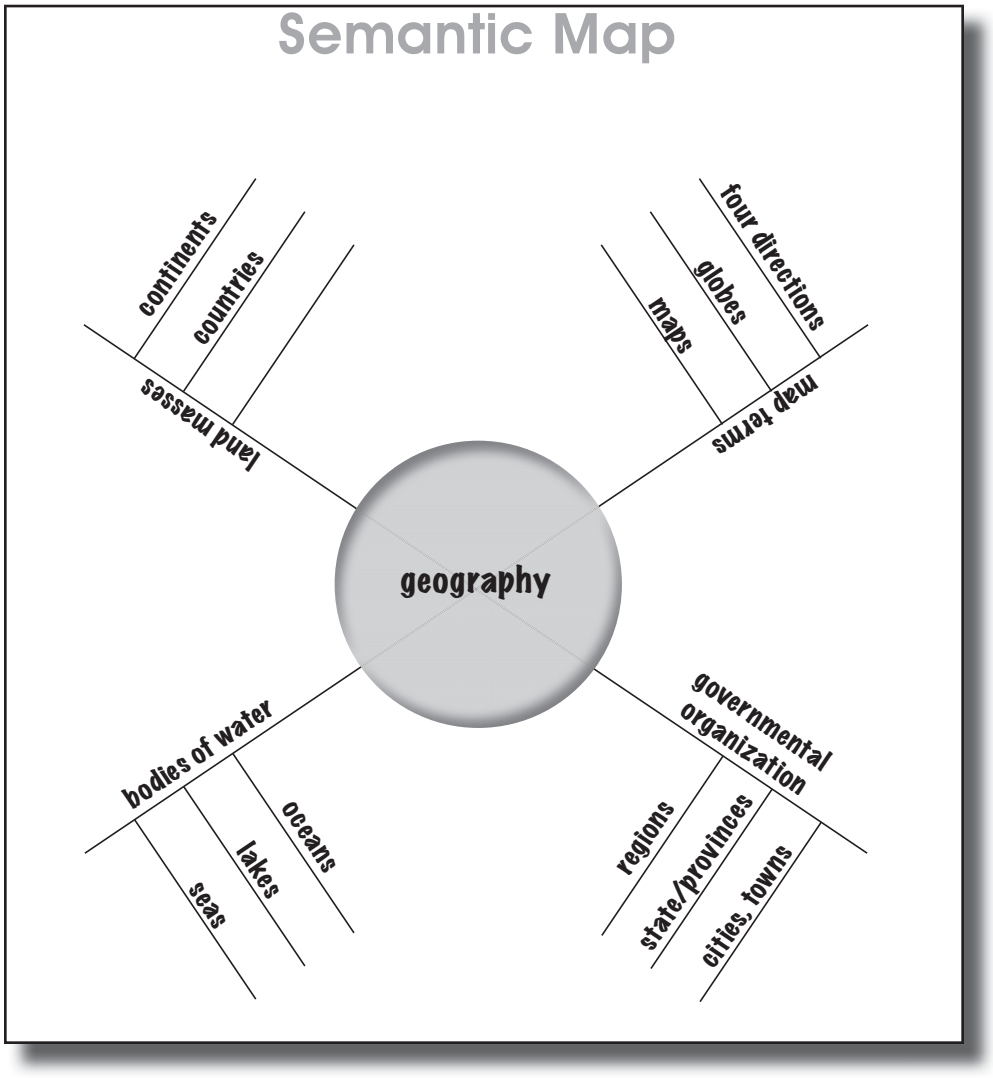
The way that learned words are stored may be as important for an individual as how many words are stored. If thousands of words are stored in a jumble, they will be used less effectively than if fewer words are stored in organized networks. Thus, it is important to teach or enrich vocabulary in categories that promote organized storage.

Purpose:

• Used to help a student visually see how words are connected and organized

Directions:

Write the concept or category in the center circle and subsets or features on the lines coming from the center. Add details to the subsets.



Word Pyramid

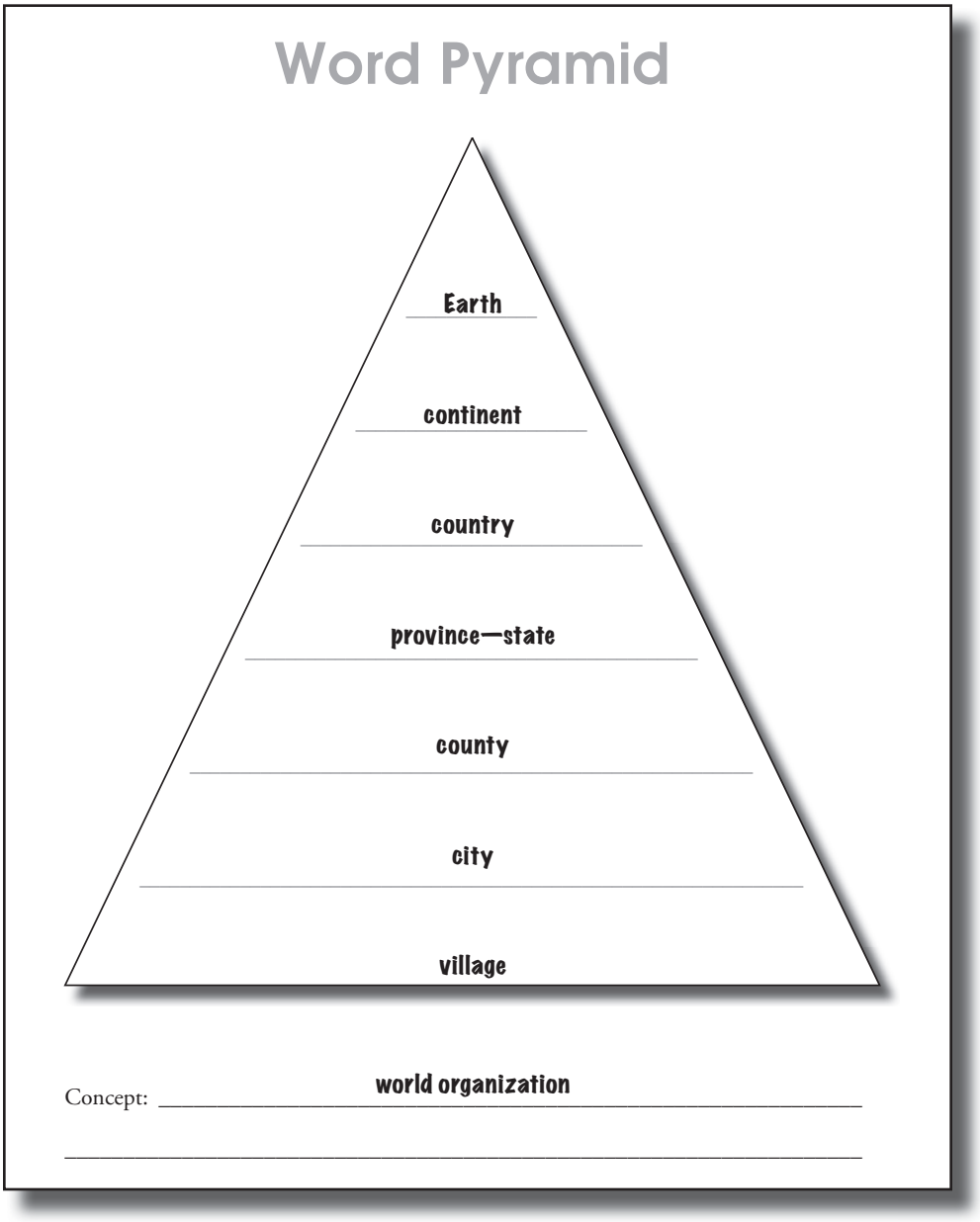
Another form of a semantic network is a hierarchical system in which there is a descending relationship among higher level categories (supersets), lower level categories (subsets), and members of the subsets. The *Word Pyramid* helps student visually see the hierarchy.

Purpose:

- Used to help a student visually see how words are connected and organized
- Used to demonstrate a hierarchical relationship among words or concepts

Directions:

Organize the concepts in sequence on the lines in the pyramid. The word with the most power or authority is at the top of the pyramid.



Degrees of Difference

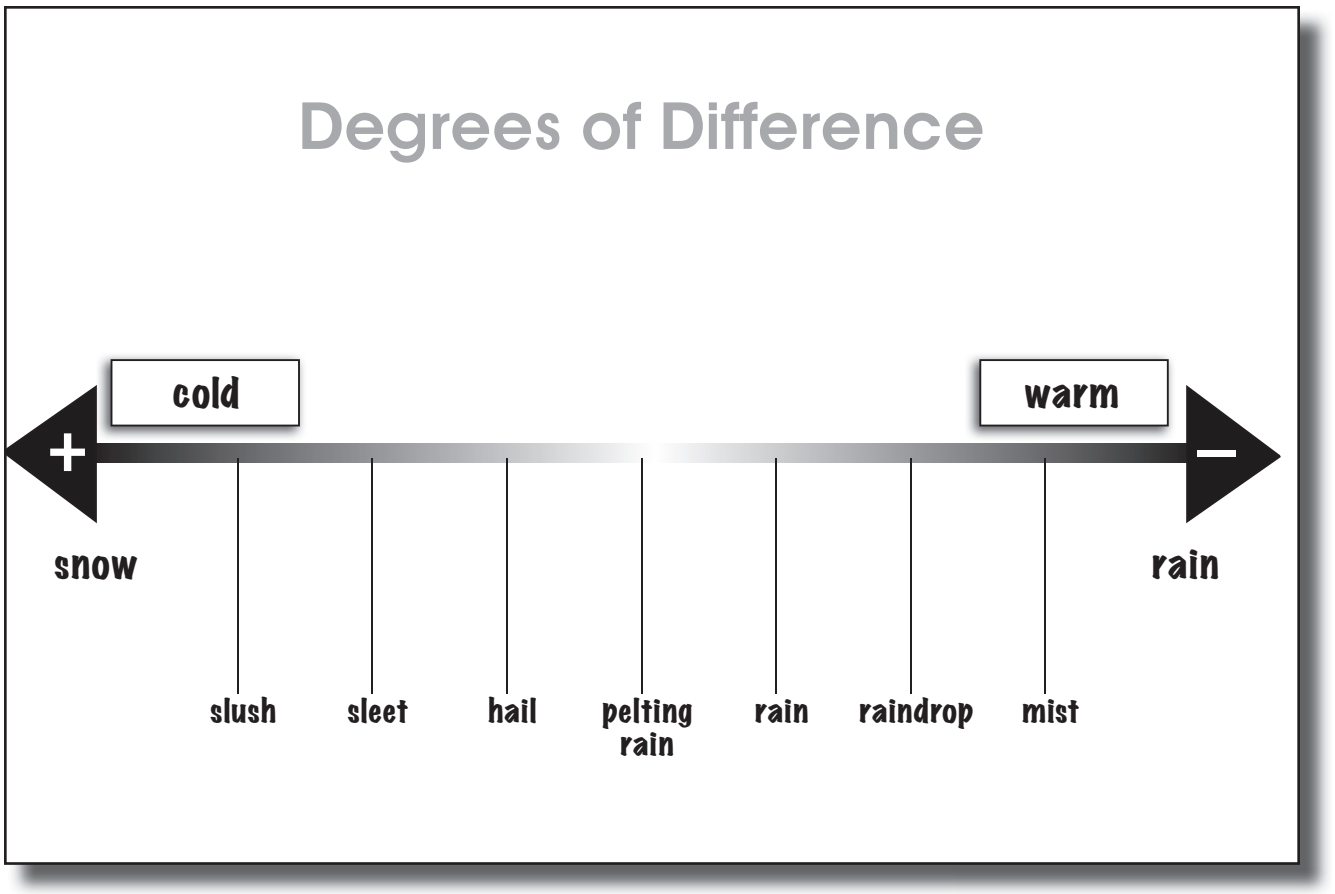
Another form of semantic network is one in which words are organized by the degrees to which they differ. The *Degrees of Difference* graphic organizer allows students to see how similar words differ only by degrees.

Purpose:

- Used to help a student visually see how words are connected and organized
- Used to narrow a student's knowledge of a word by discovering minute differences among similar words

Directions:

Have students enter two words that might be opposites at either ends of the continuum. Then enter similar words considering if they are closer to the plus side or to the minus side.



Word Grid

Another form of semantic network is one in which all forms of a word are listed. The *Word Grid* allows students to see how different yet similar words can have similar meanings.

Purpose:

- Used to help a student visually see how words are connected and organized
- Used to broaden a student's knowledge of word meaning by discovering different forms for similar meaning

Directions:

Have students list a word or concept on the top line and then list all forms of the word they can think of in the appropriate columns. Doing this activity as a group can help generate lots of forms and the prefixes and suffixes that can change meaning.

Word Grid

Theme: Thinking

New Vocabulary: thoughtless

Additional Vocabulary: _____

Nouns	Adjectives and Adverbs	Verbs
thought	thoughtful	think
thoughtfulness	thoughtless	thinks
		thought
	unthinkable	thinking

Writing Definitions

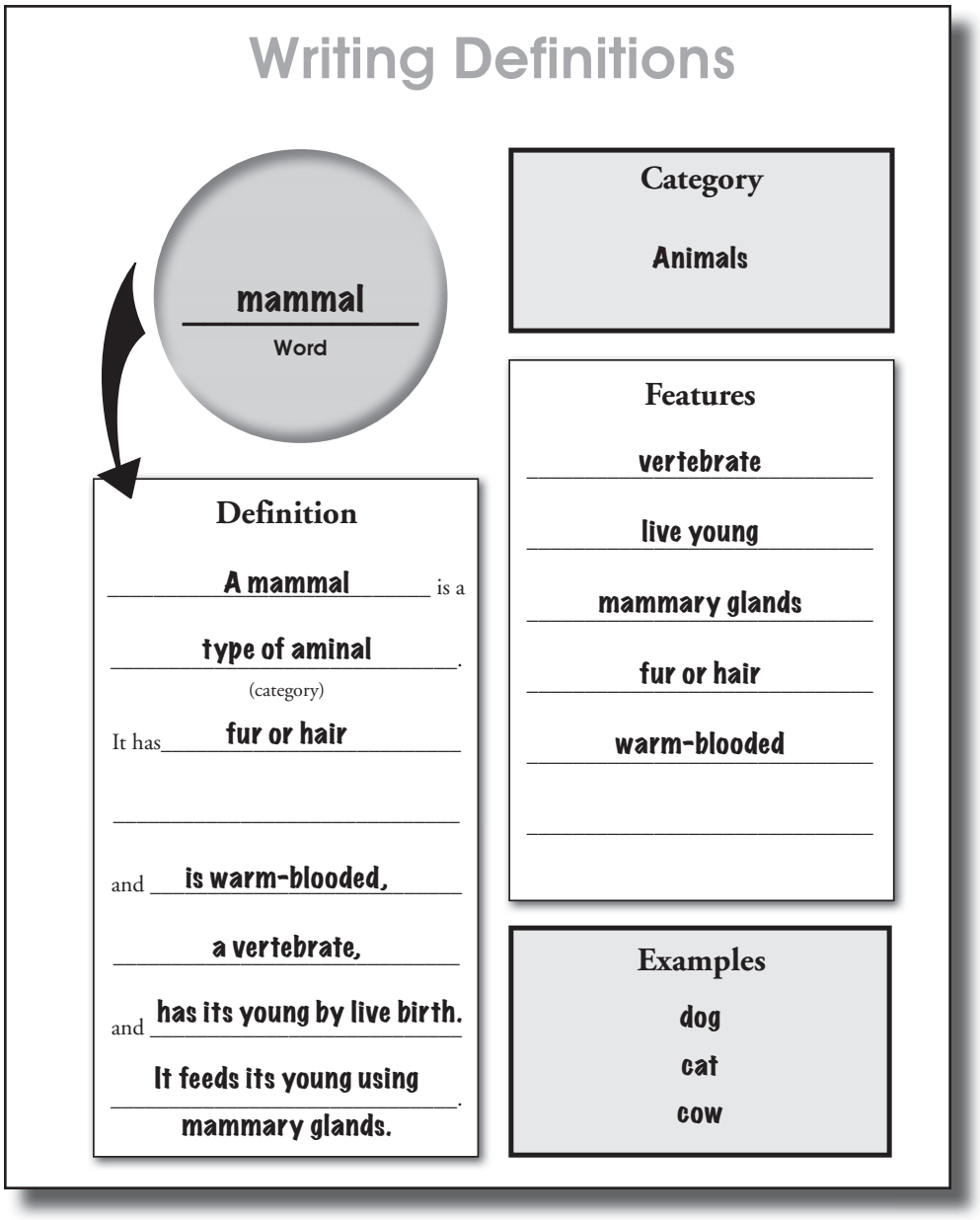
Writing Definitions gives students a writing frame for composing a definition. Students who need guidance will find this graphic organizer helpful. This graphic organizer can be used as a culminating activity to help students be precise in understanding and defining new words.

Purpose:

- Used to narrow a student's knowledge of a word meaning by combining category name, features, and examples to create a definition
- Used to help a student become precise in word use using written language

Directions:

Have students first fill in the larger category for the word they are defining. Then add features and examples. They can then use this information to form their definitions.



Multiple Meanings

It is estimated that 70 percent of the most frequently used words in the English language have multiple meanings. It is especially important for struggling readers and English language learners to understand this and learn to use context to help derive appropriate meanings for words. For example, the word *run* has many meanings as shown in the *Multiple Meanings* graphic organizer.

Purpose:

- Used to broaden a student's knowledge of a word meanings by using context (including part of speech) to determine meaning
- Used to help a student become precise in word use
- Used to help a student see the concrete and abstract meanings and the relationship between the two

Directions:

Have students write the word with multiple meanings on the line indicated. Then as they think of various meanings of the word, have them write a phrase or sentence as an example. Students will need to decide if the word in their examples is functioning as a noun, a verb, or an adjective. Add a line if another part of speech is required. Finally, students should decide whether the word use is abstract (figurative) or concrete (literal).

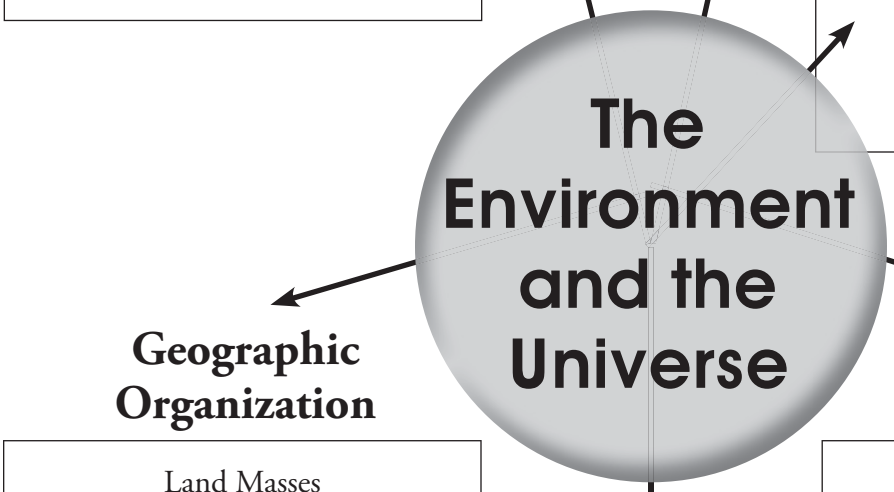
Multiple Meanings

Word run

	Examples	Abstract	Concrete
As a Noun	a run in nylon	✔	
	a home run		✔
	a 12K run		✔
	a runner in a race		✔
As a Verb	to go fast with your legs		✔
	run for office	✔	
	run to the store	✔	
	run a total	✔	
As an Adjective	running total	✔	

The Words-by-Category Lists

Section I



Animals

Invertebrates
Chordates: Vertebrates
General Terms
Extinct and Imaginary Creatures
Onomatopoeias and Animal Sounds
Products from Animal Sources
Collections of Animals
Animals Genders and Their Young

Plants

General Terms
Seedless Plants
Plants Producing Seeds
Plant Structure
Products from Plant Sources

Living Organisms

General
Animate, Inanimate, and Organic

Geographic Organization

Land Masses
Bodies of Water
Map Terms

The Natural Environment

Land
Transportation and Movement
Water
Weather
Galaxies and Outer Space
Energy

Food

General
Meals
Food Pieces
Amount of Food Wanted/Eaten
Condition of Food
Taste and Texture
Vegetables
Seeds and Grains
Fruits
Spices, Herbs, Condiments, Jams and Jellies
Breads, Crackers, Cakes, and Cereals
Candy, Desserts, and Sweeteners
Eggs
Doughs and Batter
Soups
Sauces and Dressings
Fats (Solid or Liquid)
Beverages
Meats
Seafoods
Pasta
Dairy Products
Religious Foods
Method of Cooking
Preserving Foods
Places to Eat
Words on Food Labels
Vitamins
Foods from Plants
Food from Animals

The Environment and the Universe

Living Organisms—This first grouping of words lists words representing life, to be alive, and to remain alive. It also lists actions associated with living (moving, growing, reproducing, requiring food and energy, excreting).

Animals and Plants—Both animals and plants are living organisms (i.e., having an organized body with interconnected parts that performs the functions of life); consequently, related terms comprise these two groupings. An animal is a living organism that cannot make its own food, but moves or locomotes from one place to another, has sensory structures (cells and organs), and grows by getting bigger. A plant, on the other hand, is a living organism that (usually) makes its own food, does not move from one place to another, and does not have special organs of sensation, digestion, or locomotion. Plants make their own food via photosynthesis, respond to the environment by growing (most), and grow by generating new or additional parts.

The words in Animals and Plants are interdependent. As an example, the words and concepts might have a direct application to understanding general science, biology, botany, and zoology. But these terms and concepts might also be independently learned as related to specific curriculum content. The animals and plants could be further categorized by their relationship to climatic regions of the world or to whether they are aquatic, live on land, or are animals that fly.

Food—The food category is a collection of words representing meals and the food we eat. It also contains the sources of food items, such as from animals or from plants. Some words relate to nutrition, food, and diet; and these terms align with health education and family and consumer education curriculums.

The Natural Environment—This grouping shifts to environmental terminology related to geology, geography, and moving from place to place on land, in the air, and in the water. These groups also include weather and terms related to space and outer space.

Geographic Environments—This list presents terms for organizing the geographic environment. It includes terms related to land masses and bodies of water.

Terms from these last two groupings align to standards in life science, earth and space science, and science for personal and social perspectives and address terms commonly found in geography, geology, and general science curriculums.

Living Organisms

General

Nouns	Adjectives/Adverbs	Verbs
life	alive	live
	living	
organism	organic	
animal	animate	
	inanimate	
botany	botanical	
botanist		study
zoology	zoological	
zoologist		
zoo		
aquarium		
biology	biological	
biologist		
plant		
horticulture		
agriculture		

Animate, Inanimate, and Organic

Nouns	Adjectives/Adverbs	Verbs
food		eat
energy		nourish
photosynthesis		photosynthesize
		eat
digestion	digested	digest
growth		grow
respiration		respire
breath		breathe
oxygen		
carbon dioxide		
excretion		excrete
defecation		defecate
reproduction	sexual	reproduce
	asexual	
birth		
locomotion		locomote
movement		move
sensation	sensory	sense
feeling		feel

Animals

Invertebrates

	Nouns	Adjectives/Adverbs	Verbs
Eukaryota: One Cell	amoeba paramecium	one-celled	
Jellyfish	hydra medusa		
Annelids	earthworms leeches hermaphrodite skin	bilaterally symmetrical elongated segmented freshwater marine/sea water soft moist	 regenerate suck crawl
Arthropods	**arachnids** mites spiders ticks scorpions exoskeleton cephalothorax abdomen legs (4 pair) parasite eggs	 eight pincers claws parasitic unisexual	 burrow molt protect support infest reproduce

Animals—Continued

Invertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Arthropods—Continued	**mites** spider mites dust mites eggs parasite	microscopic parasitic soft diverse	infest lay burrow suck infest
	ticks parasite	parasitic soft diverse blood feeding	burrow suck infest feed
	spiders poison antennae web	poisonous free-living	inject spin crawl jump kill
	scorpions cephalothorax abdomen tail/metasoma sting legs (4 pair) claws/pedipalps (1 pair) eyes venom	segmented	inject paralyze

Animals—Continued

Invertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Arthropods—Continued	**myriapoda** body centipede millipede environment poda (leg) **centipedes** antennae body centi = 100 ped = leg exoskeleton eyes feelers jaws legs mandibles venom	segmented terrestrial land myria (many) jointed segmented terrestrial chitinous simple poisonous multi-paired oviparous viviparous	 sting protect support hunt inject
	millipedes milli-thousand body legs antennae eyes environment	 many-legged jointed segmented wormlike cylindrical short simple oviparous terrestrial	 crawl roll

Animals—Continued

Invertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Arthropods—Continued	**crustaceans** crab lobster crayfish shrimp krill barnacles environment body antennae exoskeleton claws eyes gills legs mandibles	 oviparous aquatic marine freshwater two-part chitinous compound paired multi-paired	 molt protect support walk regenerate run burrow crush
	insects bee beetle butterfly cockroach cricket grasshopper housefly mosquito moth ant black fly bumblebee fly gnat		 pollinate fly hop jump swim bite sting

Animals—Continued

Invertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Arthropods—Continued	ladybug locust wasp body **head** mandible antennae eyes **thorax** legs (3 pair) wings (2 pair) **abdomen** exoskeleton metamorphosis	 compound jointed segmented oviparous terrestrial complete incomplete	 migrate chew smell molt
Echinoderms	sand dollar sea cucumber sea urchin starfish arms feet plates	marine five tubular spiny calcareous	 regenerate protect support
Platyhelminthes	flatworm fluke planaria tapeworm body cilia disease hooks spine suckers	parasitic nonparasitic flattened unsegemented	 carry

Animals—Continued

Invertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Mollusks	mantle nervous system bivalves univalves cephalopods **univalves** conch slug snail body foot radula shell tentacles	 specific marine freshwater terrestrial oviparous soft mantles strong muscular flexible tongue-like single spiral	 crawl contract expand creep scrape protect
Bivalves	abalone clam muscle oyster foot muscles gills mantle shell	 muscular strong powerful hard hinged limy two-part	 move expand contract pull respire protect secrete expand open close

Animals—Continued

Invertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Bivalves—Continued	**cephalopods** nautilus octopus squid arms gills ink jaws mantle tentacles	eight	 propel swim tear protect
Porifera	sponge skeleton	stationary porous internal	 regenerate attach

Chordates: Vertebrates

	Nouns	Adjectives/Adverbs	Verbs
Fish	**jawless fish** hagfish lamprey body skeleton	 long slimy scaleless tubular cartilaginous flexible tough	 protect support

Animals—Continued

Chordates: Vertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Fish—Continued	**cartilaginous fish**		
	ray		
	shark		
	skate		
	skeleton		protect
		flexible	support
		tough	
	gill		
	bony fish		
	bass		
	grouper		
	trout		
	cod		
	haddock		
	herring		
	salmon		
	sardine		
	sole		
	trout		
	tuna		
	pike		
	skeleton	bony	protect
		internal	support
	body temperature	cold-blooded	change
	reproduction	oviparous	
		ovoviviparous	
		marine	
		freshwater	
	fins	fanlike	balance
			propel
			steer
			swim
	gills		breathe
			respire
	scales	hard	protect
		overlapping	grow

Animals—Continued

Chordates: Vertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Amphibians	frog salamander toad newts bullfrog		
	body temperature	cold-blooded	
	environment	freshwater terrestrial	
	eggs tadpole	oviparous jellylike	reproduce metamorphose
	limbs	webbed	creep hop jump swim
	lungs skin	small moist	breathe respire
Reptiles	alligator crocodile lizard snake	garter poisonous	
	rattler	nonpoisonous	
	turtle body temperature	cold-blooded	
	environment	freshwater terrestrial marine	
	fang	dry fang	bite
	eggs	oviparous ovoviviparous	reproduce

Animals—Continued

Chordates: Vertebrates—Continued

	Nouns	Adjectives/Adverbs	Verbs
Reptiles—Continued		leathery	
	scales skin	dry scaly thick waterproof	protect molt
	shell legs		climb dig run swim
	lungs		breathe respire
Birds/Aves	blackbirds blue jay bobwhite goose canary chicken crane crow cuckoo dove duck eagle goldfinch goose hawk hummingbird jay kingfisher lark magpie minnow nightingale ostrich owl parrot partridge peacock	Canadian	