Graphic Models and Instructional Tools

for Students with Special Needs (revised)

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FEBRUARY 2017

To the Reader: This documentis intended for educators with interest in students with special needs. It provides various graphical models and instructional tools that relate to teaching reading, writing, math, and social studies and science to students with disabilities. The paper is divided into four sections: reading, writing, math, social studies and science. In each section, multiple examples of models are provided. The information provided can be used for general knowledge, as part of course content in special education classes and/or as reference material. The authors acknowledge the work of Allison Meade and Wendy Bailey-Joseph in developing an earlier edition of this document. Individual pages can be used for no charge for non-commercial purposes (e.g., classroom instruction) only. Permission is required for any other purposes.

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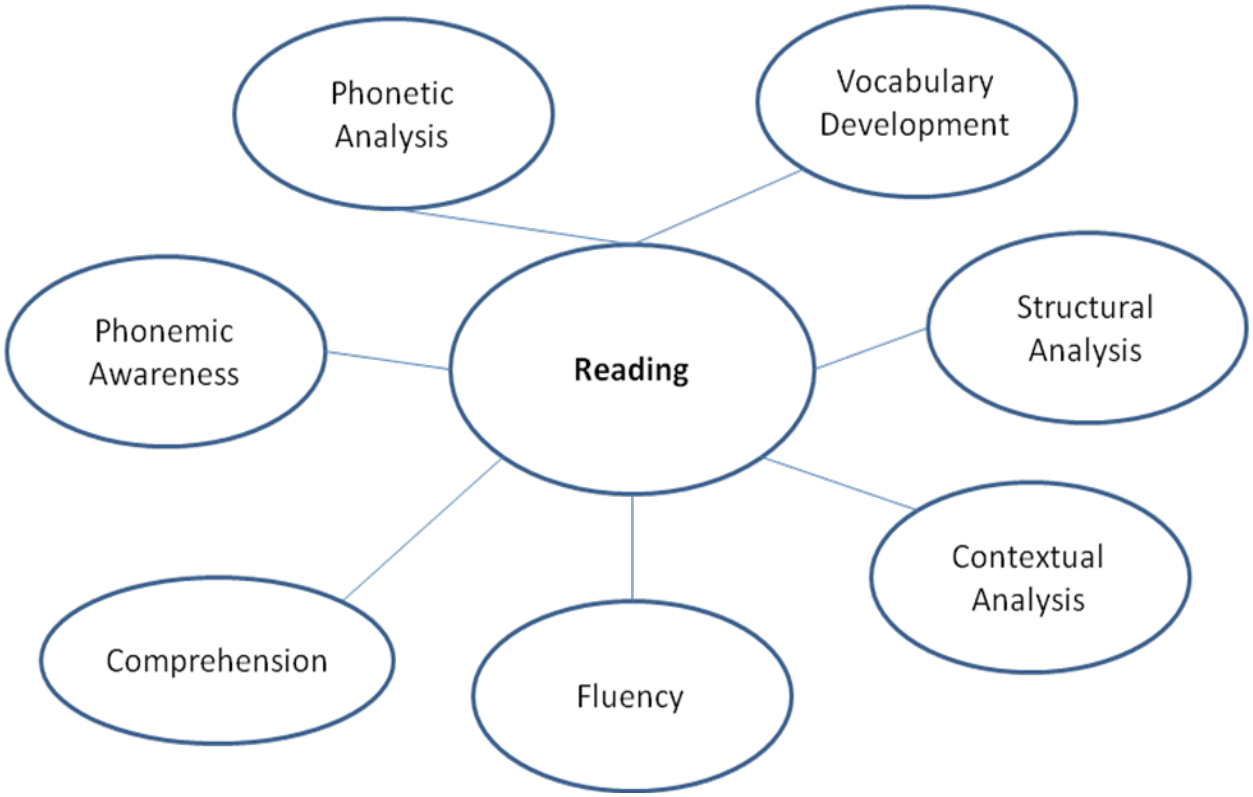
Section One: Reading

Key Reading Components



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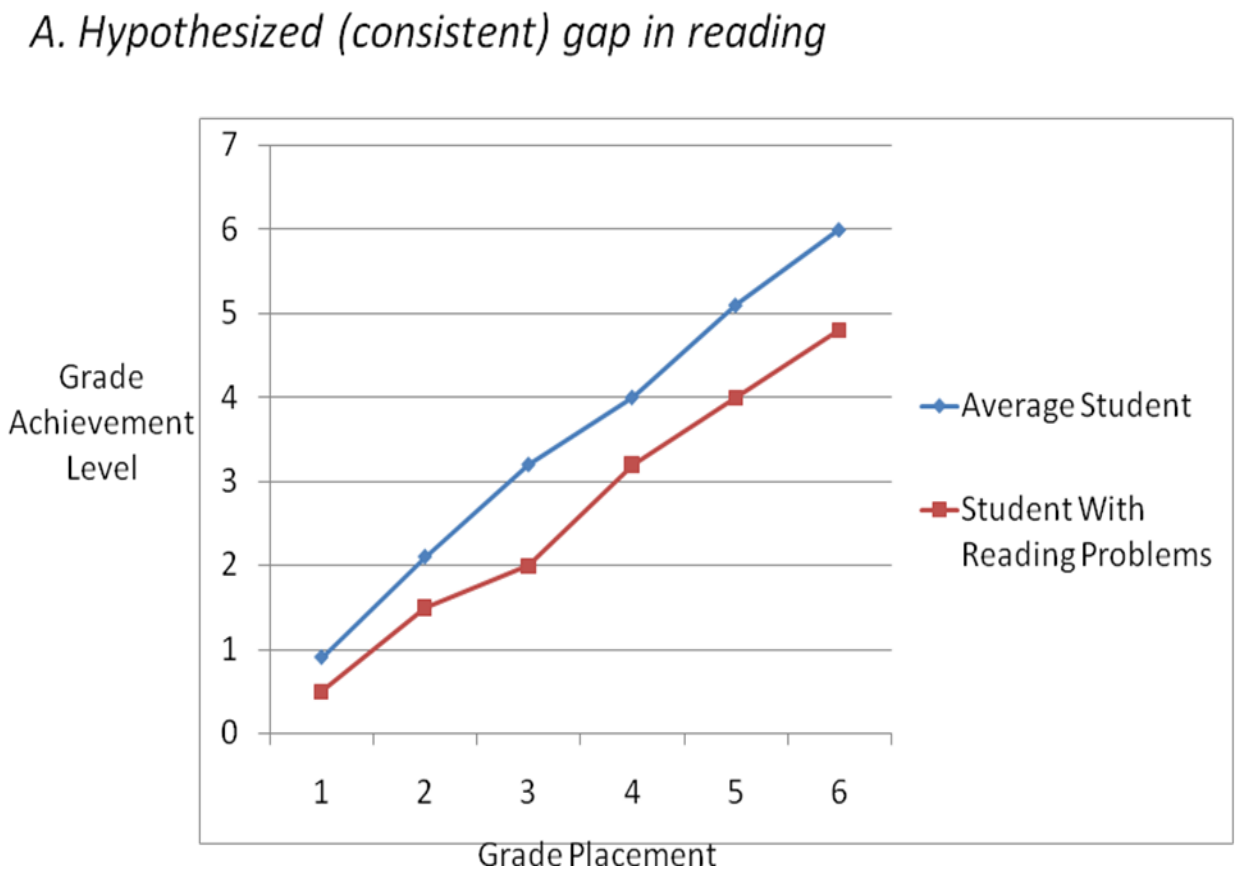
Model for Consistent Deficit Effects in Reading



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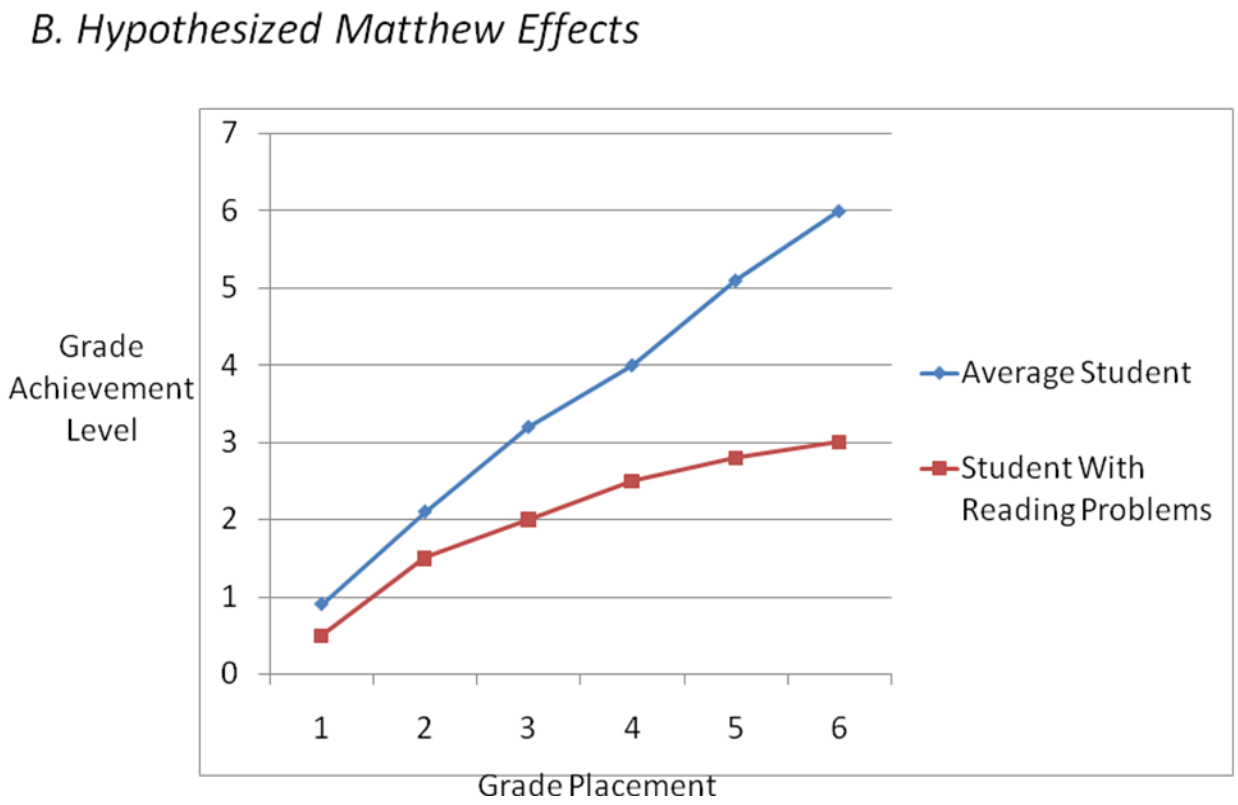
Hypothesized Mathew Effects



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Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 8. Adapted from model developed by B.Virgile and used with permission.

Elements of the Alphabetic Principle

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 9.

Phonics Generalizations

Rule	Examples	Exceptions (numbers)	Utility Rate
Ch= 1 sound	church (103)	- (0)	100%
Ee= long	deem (85)	keen (2)	98%
-are (care)	bare (9)	are (1)	90%
Silent e	tone (180)	gone (106)	63%
2 v's walking	lead (309)	been (377)	45%
Medial vowel	west (408)	cold (249)	62%
Vowel ends 1 syllable word	she (23)	to (88)	21%
r sound	born (484)	fire (134)	78%
ow as long	flown (50)	clown (35)	56%
y vowel =long "i"	sky (29)	sunny (170)	15%
c=s before e, i	city (66)	ocean (3)	96%
c=k before a, o	car (143)	- (0)	100%

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 10.

English Language Phonemes

Consonant Phonemes		Vowel Phonemes	
Phonetic Symbol	Spelling Example (Common Graphemes)	Phonetic Symbol	Spelling Example (Common Graphemes)
/b/	ball	/a/	bar
/d/	dig, down	/æ/	sat, after
/f/	fish, photograph	/ai/	by, pie, dry
/g/	mug, goal	D \	now, south
/h/	home, hot	/ b/	claw, thought
/j/	yet	' <	choice
/k/	cup, luck, kale	/e/	pet
/l/	lazy, call, lap	/ei/	reign, play
/m/	more, hammer	/i/	tea, flee
/n/	name, knife	/o/	fox
/p/	pig	/ou/	grow, boat
/r/	run, wrap	/u/	blue, influence
/s/	cite, same	/ ˜/	boot, food
/t/	Time, trap	\ %	poor, manure
/v/	vote	/^/	cut
/w/	what	.	purse, prefer
/z/	zip, zebra		
G a	judge, ridge		

O a	treasure
œ	nation, ship
W œ	perch, church
¾	sing
	thing
/ö /	mother, them

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p121-

Assessment of Oral Reading

Adapted from Language Instruction for Students with Disabilities (4th ed., rev.), by E. A. Polloway, L. Miller, & T. E. C. Smith, 2012, Denver, CO: Love Publishing (p. 272)

Word Recognition Emphases

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p.14.

Vocabulary Development

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 15.

Sixty High-Frequency Words

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p.16.

after	did	his	she	through
always	done	inside	so	two
any	each	just	subject	what
because	first	men	teacher	where
become	friend	morning	teenager	which
black	give	need	tell	while
blue	great	open	the	white
book	help	people	their	why
choice	her	please	there	women
class	hers	remember	they	yes
could	here	run	them	you
close	him	school	this	your

Protection and Survival Words and Phrases

Beware of dog	Entrance	Information	No turns	Restrooms
Boys	Exit	Keep away	On	Slippery when wet
Bus Stop	Exit only	Keep closed	One way	Slow down
Caution	Flammable	Keep off	Off	Smoking prohibited
Closed	Gentlemen	Keep out	Open	Step down
Cold	Girls	Ladies	Out	Stop
Danger	Go	Men	Out of order	Walk
Do not cross	Help	No parking	Poison	Warning
Do not enter	Help wanted	No right turn	Private	Watch your step
Do not touch	Hospital zone	No smoking	Pull	Women
Don't walk	Hot	No swimming	Push	Wrong way
Down	In	No trespassing	Quiet	Yield

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 17.Adapted from Polloway, E. A., & Polloway, C. H. (1981). Survival words for disabled readers. Academic Therapy 16, 446- 447.

Morpheme Meanings: Examples and Non-Examples

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Morpheme: Prefix/Suffix	Meaning	Example	Non-example
bi-	two	bicycle	binder
un-	not	unlikely	unite
pan-	all	pandemic	panther
-ject	to throw	interject	subject
-hood	body of people	priesthood	likelihood
port	to carry	teleport	report
post	after	postdate	poster
-able	capable of being	suitable	table
-pel-	to drive	compel	spelling
tri-	three	tricycle	trip
-ly	way of doing	quickly	sly
re-	do it again	repeat	read

Bound and Free Morphemes

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p.19.

Free Morphemes	Bound Morphemes
boy	un-
cat	-able
tree	-er
gentle	-s
man	-ceive
port	-ful
post	de-
script	-atic-
script	-tion
book	-ing
read	re-
test	pre-
dog	dis-

Common Prefixes

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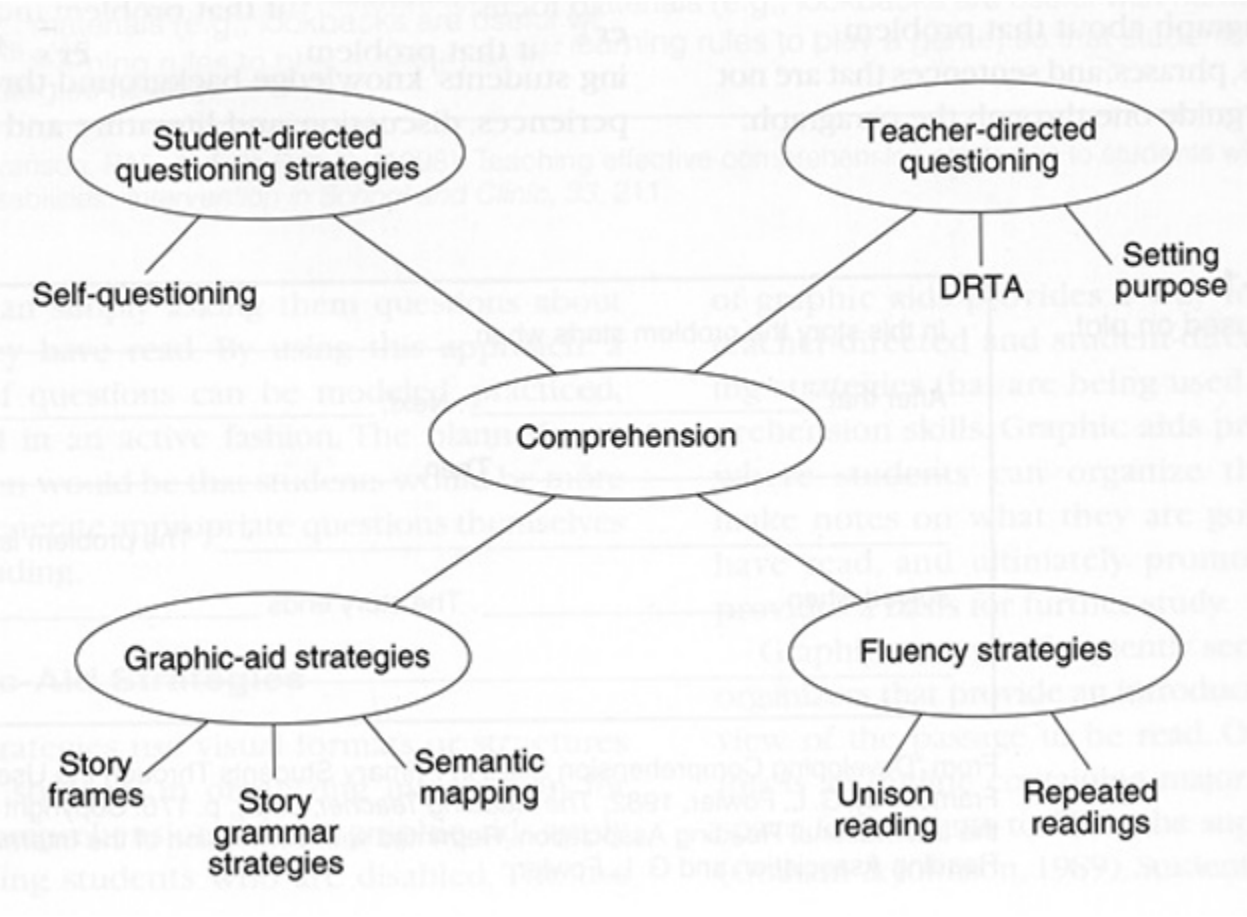
Prefixes	Example
Un-	unfaithful
Re-	reconnect
In-	incredible
Dis-	disappoint
En-	endanger
Non-	nonsense
Im-	impractical
Over-	overanalyze
Mis-	misfortune
Sub-	sublet
Pre-	prejudge
Inter-	interlock
Fore-	aforementioned
Re-	re-read

Semantic Mapping: example



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Reading Comprehension: Informal Assessment Tools

Strategy	Description and Implementation
Change questioning	x Vary type of questions asked x If student is not responding correctly to literal questions; change to interpretive or vice versa. x Note this and watch for improvement x Model how to respond to various types of questions
Cloze Passages	x Include a paragraph (or set of paragraphs) with missing words at strategic points x Student read the passage and use context clues to determine the missing word x Scoring rubric is used to determine comprehension level
Direct Observation	x Observe student in different texts- informational text is more difficult x Take notes and keep in student file x Form and test hypothesis for instruction
Informal Reading Inventories	x Helps determine independent, instructional, and frustrational reading levels x Student reads a set of graded word lists and reading passages (orally and silently) x Student is asked comprehension questions at varying levels x Score determines reading level
Oral Reading Speed	x Choppy reading - analyze for decoding issue of word or whole phrase x Helps develop fluency
Pocket Vocabulary	x Student has to 'pocket' word for vocabulary that has been introduced x Known vocabulary should kept in 'pocket' at all times
Retelling	x Requires student to recall parts of a story, for example, "tell me about you just read" x Ask for more details if student do not say much, by rephrasing the question or making it more specific, for example, "what happen after…" x Works for entire passage, and specific word issues x Helps with recalling of facts, sequencing, and developing vocabulary
Running Record	x Requires student to read from text of known readability level x Listen to student read roughly 100 words in book used for reading instruction x Mark check for each word read correctly x Write in word said (and write underneath word that should have been said)

Strategy	Description and Implementation
	x Helps determine student's reading instructional level
Think Alouds	x Student openly share thoughts about reading material. It could be before, during or after reading. x Activates prior knowledge, and so leads to more inferential thinking x It helps teacher know how student is processing text as it provides information on student understanding of the reading material

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 22. Adapted in part from Reading Comprehension: Strategies for Independent Learners, by Bachowicz and Ogle, 2001. Developed by Jeri Watts, Lynchburg College.

Graphic Organizer for Summarizing: Peer-Mediated Strategy

Summarizing
What do I know after reading? x _____ x _____ x _____
What questions/answers do I have for my buddy/partner? x _____ x _____ x _____
What answers do I have for my buddy/partner? x _____ x _____ x _____
How can I summarize what I read in one paragraph? _____ _____ _____ _____ _____ _____

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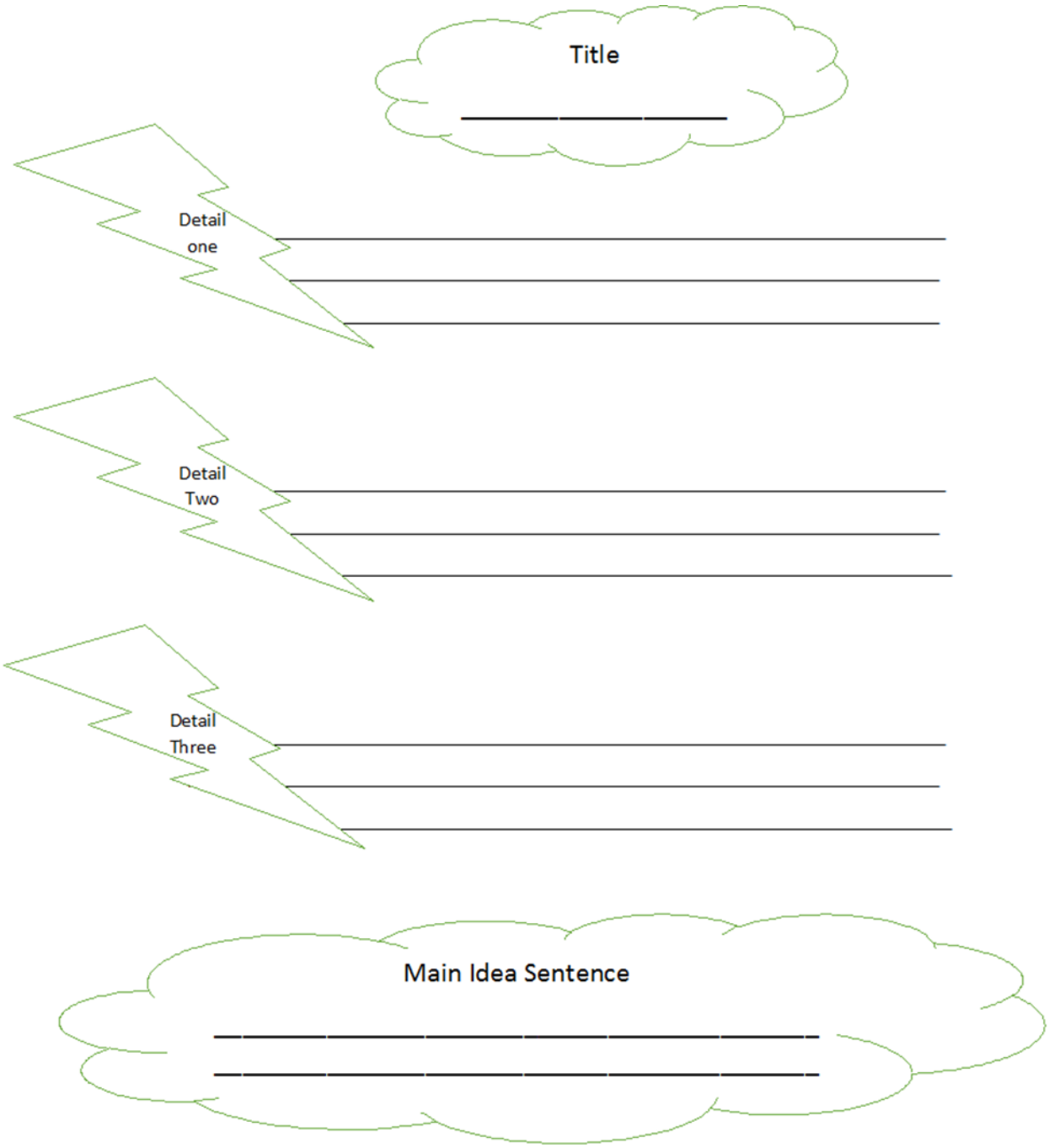
Main Idea Map



Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 25.

Section Two: Writing

Narrative Story Frame

Narrative Story Frame
Characters x _____ x _____ x _____
Setting x _____ x _____
Conflict _____ _____ _____ _____
Resolution _____ _____ _____ _____

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Writing Process (adapted from Polloway, Miller & smith, 2012)

Using a Story Map: Snow White

Questions	Answers
Who are the characters?	x Snow White x Seven Dwarfs x Wicked Queen x Prince Charming x Magic Mirror
Where does it take place?	A faraway land
When does it begin?	Once upon a time
What is the problem?	Snow White is in an enchanted sleep due to a poison apple
What is the goal?	To awaken Snow White with true love's kiss
What are the events?	x Magic Mirror reveals Snow White is the fairest in the land x Wicked Queen tries to have Snow White killed x Snow White escapes and meets Dwarfs. x Snow White eats poison apple. x Prince Charming kisses Snow White
What is the result?	The Prince and Snow White live happily ever after.

Polloway, E. A., & Lubin, J. (2017). Graphical models and instructional tools students with special needs. Lynchburg College Journal of Special Education, 14, p. 29. Adapted from A.L.Meade.

Writing Characteristics: Typical Observations

Stages of Writing	Students with Writing Problems	Student with Writing Skill
Planning/Pre-Writing	Limited in sense of purpose & audience, limited time and focus on planning, non-strategic approach, limited content knowledge	Know/appreciate audience in focus, sufficient planning, organized approach to process, strategic approach
Transcribing/Writing	Shorter products, poor organization, syntax errors, less content, non-relevant content	Know writing genres, use writing strategies to develop work, longer products, content clear and relevant
Revising & Editing/Post-Writing	Poor overall quality, limited revision, minor editing, emphasis more on mechanics than content	Use recursive process to integrate editing/revising with drafting, focus on both editing of mechanical aspects as well as content revisions

Polloway, E. A., & Lubin, J. (2017). Graphical models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, p. 34.

Use ofPronouns

Pronouns	Question	Applicability	Example
it's (or) its ?	Can you replace the word with: <u>it is</u> or <u>it has</u> ?	< H V :	it's
		1 R :	its
who's (or) whose ?	Can you replace the word with <u>who is</u> or <u>who has</u> ?	< H V :	who's
		1 R :	whose
I (or) me ?	Is I/me the same person as the subject of the sentence?	< H V :	I ("The winner was I." Winner and I <u>are</u> the same person)
		1 R :	me (1."Sally called me." 2. "The ball hit me."
Stan and me (or) Stan and I ?	If you take "Stan" away, is it still right?	< H V :	Keep what you have (remember put yourself last.)
		1 R :	Switch to the other one(remember put yourself last)

Polloway & Lubin (2017) . Adapted from Scott, J. (2011) and used with permission.

Story Cluster Sentences Sentence Combining

1. It was her birthday.
2. She was very happy.

Cluster: _____, and she_____.

3. She had planned all year for her party.
4. She had reserved the location with a swimming pool.

Cluster: As a result of _____ , she was able to_____.

5. Her father had assisted her.
6. He was very helpful too.

Cluster: Her father, _____, had _____.

7. Her father had ordered all the decorations.
8. She was very surprised when it came a month before her birthday.

Cluster: Prior_____, and she_____.

9. She was bubbling with joy.
10. “I love you daddy,” she whispered in his ear while she hugged him.

Cluster: Feeling _____, she said “_____.”

Polloway, E. A., & Lubin, J. (2017). Graphical models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 1, 32. Adapted from a model developed by Strong (1983).

Paragraph Graphic Organizer

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Four Strategies for Composition Writing

Polloway, E. A., & Lubin, J. (2017). Graphical models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 1, 34.

High Utility Spelling Words

a	about	after	again	all	always
am	and	another	any	are	around
as	at	away	back	bad	ball
be	because	been	before	began	behind
best	better	big	blue	book	box
boy	but	by	call	come	can
children	could	day	did	do	does
down	each	eat	even	ever	every
far	fast	find	first	fly	for
found	friend	from	fun	get	girl
give	go	good	got	grow	had
hand	happy	has	have	he	help
her	here	him	his	home	house
how	i	if	in	into	is
it	it's	jump	keep	know	last
left	let	like	little	live	long
look	made	make	man	many	may
me	my	name	need	never	new
next	night	no	not	now	of
off	on	once	one	only	or
other	our	out	over	play	put
ran	red	ride	right	room	run
said	sat	saw	say	school	see
she	show	small	so	some	something
stop	story	take	tell	than	that
the	them	then	these	they	thing
think	this	thought	through	time	to
together	too	try	two	under	until
up	us	very	walk	want	way
was	water	we	went	were	what
when	where	who	why	will	with
woman	work	yes	you	your	zoo

Polloway, E. A., & Lubin, J. (2017). Graphical models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, p. 34.

Graphic Organization for an Explanation Paragraph

Explanation Writing
Provide setting background (for task to be explained)
First, (initial step)
Second, (second step)
Third, (third step)
Finally, (last step)

Polloway, E.A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 14, p. 36. Adapted from a model developed by Englert & Mariage.

Post- Writing Learning Strategy: REVISE

R - Re-read your paper to make sure it says what you want.

E- Edit using COPS

V- Vocabulary chosen to be appropriate for purpose

S- Sentences complete and varied

E- Evidence provided to support your points

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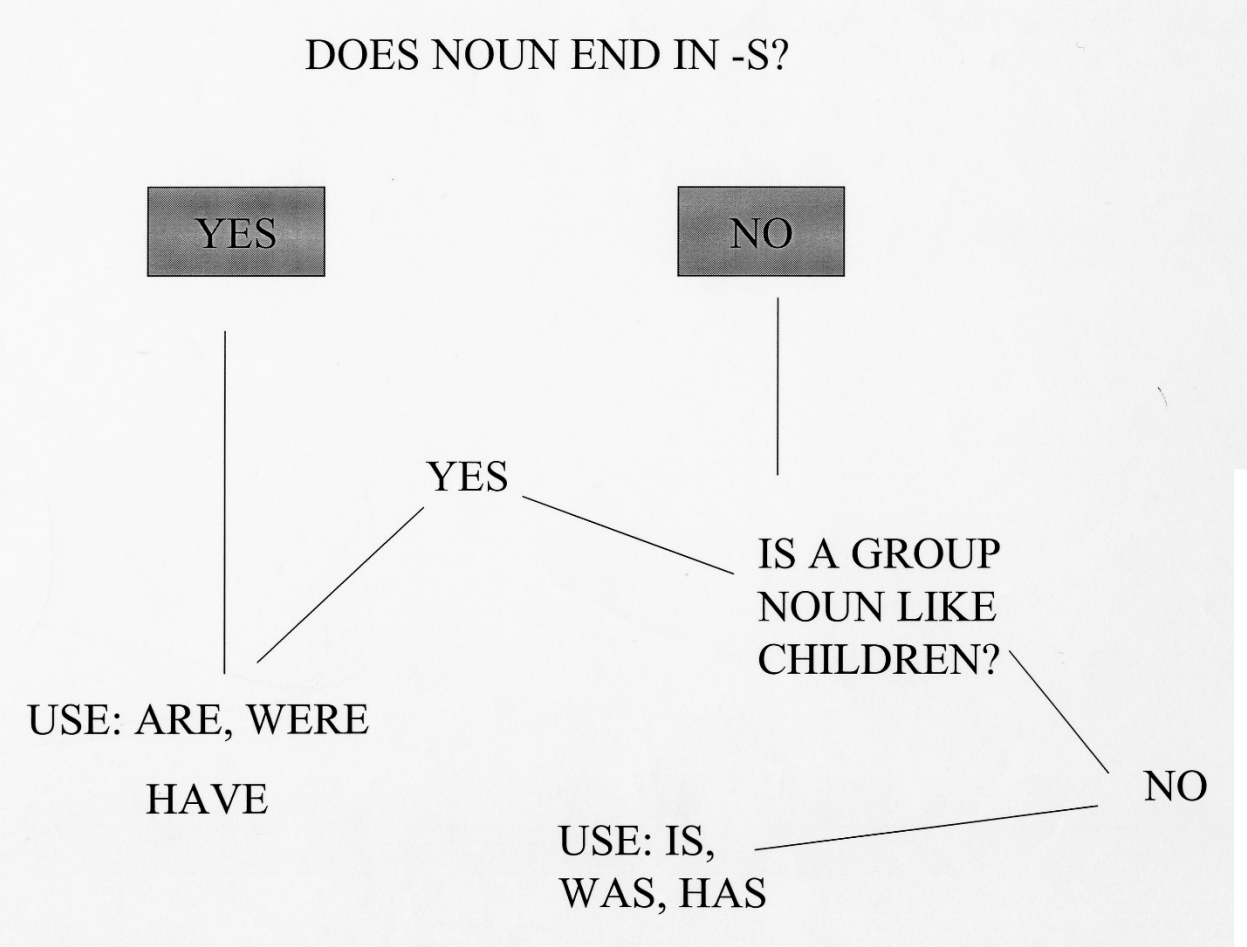
Noun-Verb Agreement



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Section Three: Math

Problem Solving: Dilemmas and Strategies

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Problem-Solving Strategy:

SOLVE-IT

S ay the problem to yourself (repeat)

O mit information not needed

L isten for clue words

V change vocabulary to numbers, symbols

E write math equation

I ndicate the answer

T ransfer answer to problem's context

Problem Solving: Determining Correct Computation

Miguel had 60 cents. He spent 38 cents for lunch. How much does he have?

	Do you have the big number (name total)?	Do you need the big number (need total)?
Same size/equal groups?	/	X
Different size/unequal	–	+

Polloway, E. A., & Lubin, J. (2017). Graphical models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, p. 142.

Strategy for Solving Word Problems

Look for operational terms in word problems

Create a concrete or mental picture of word problem

Select a strategy to be used

Use that strategy

Review strategy and solution

Re-strategize if answer is incorrect and new strategy needed

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Simple Math Computation Matrix

	Add, no distractor	Add, with distractor	Subtract, no distractor	Subtract, w/ distractor
1 digit, 2 items	Mary had two apples. Her brother gave her two bananas. How many fruits does she have?	Mary had two apples. Her brother gave her two bananas and a lollipop. How many fruits does she have?	Mary had nine apples and five bananas. Her brother ate two apples and one banana for lunch. How many fruits does she have left?	Mary had nine apples and five bananas. Her brother ate one banana, one carrot and two apples for lunch. How many fruits does she have left?
2 digit, 2 items	Jon bought 22 pencils and 17 pens. How many items did he buy?	At the bookstore, Jon bought 13 pencils, 12 pens and 10 magazines. How many pens and pencils did he buy?	Jon bought 22 pencils and 17 pens. He gave 10 pens and 13 pencils to his best friend. How many pens and pencils does he have left?	Jon bought 22 pencils and 17 pens. He gave 10 pens, 12 magazines and 13 pencils to his best friend. How many pens and pencils does he have left?

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Section Four: Social Studies & Science

Social Studies Acrostics

Category	Data to be Learned	Sample Acrostic/s
Assassinated American Presidents	Lincoln, Garfield, McKinley, Kennedy	Lunatic gunmen maliciously killed.
Cabinet offices (in order of creation,1-25)	State, Treasury, Defense, Justice, Interior, Agriculture, Commerce, Labor, Health/Human Services, Housing & Urban Development, Transportation, Energy, Education, Veterans' Affairs, Homeland Security	See The Dog Jump In A Circle and Leave Her House To Entertain at Virginia Homes in the Suburbs
Central America Nations	Mexico, Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama	My best girl, Elizabeth, has no Cocoa Puffs!
Confederate States (seceding from Union)	Virginia, North Carolina, Florida, Georgia, Texas, Mississippi, Alabama, Louisiana, Arkansas, Tennessee	Virgil needs fundamentally good teaching methods about learning ability techniques OR My Very Nice And Lovely Sister Gretchen Flew To The Airport.
Continents	Africa, Asia, Antarctica, Australia, South America, Europe, North America	4As simply exhibit need.
First 16 American Presidents	Washington,Adams, Jefferson,Madison, Monroe, John Quincy Adams _____	Washington And Jefferson Made Many Admirers ====

Category	Data to be Learned	Sample Acrostic/s
	Andrew Jackson Martin Van Buren William Henry Harrison John Tyler _____ James Polk Zachary Taylor Millard Fillmore Franklin Pierce James Buchannan Abraham Lincoln_	Juggling Various Heavy Toys. ==== Please Try Following Pretty Boy's Legacy.
Oceans of the World	Southern, Arctic, Pacific, Indian, Atlantic	Silly Ants Play In Attics
Nine Largest Islands	Greenland, New Guinea, Borneo, Madagascar, Baffin, Sumatra, Honshu, Great Britain, Victoria	Green Geese boys may baffle some honest great victors.
Virginia Geographical Regions	Tidewater, Piedmont, Blue Ridge, Shenandoah Valley, Appalachians	Tim Picks Blue Stars Again

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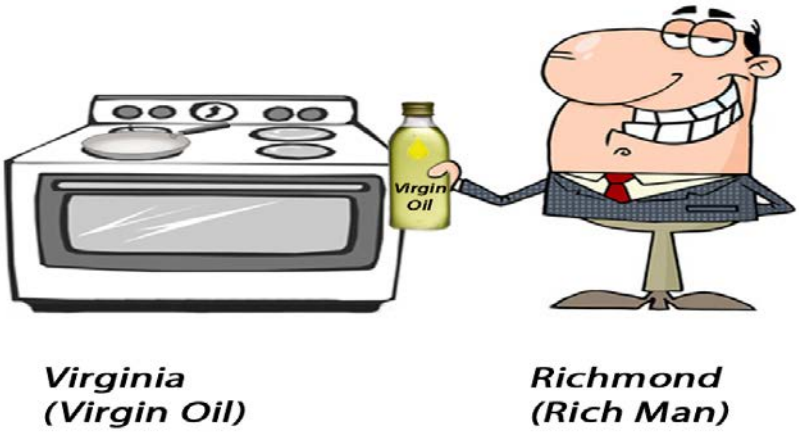
Social Studies Acronyms

Category	Data to be Learned	Sample Acronym
Continents	Africa, Asia, Antarctica, Australia, North America, South America, Europe	4ANSE
Great Lakes	Huron, Ontario, Michigan, Erie, Superior	HOMES
Virginia Rivers of Chesapeake Bay Watershed	James, Potomac, Rappahannock, York	J-PRY
WWI Allied Powers	France, Italy, Russia, England	FIRE
WWI Central Powers	Turkey, Austria-Hungary, Germany	TAG
United Kingdom	Wales, (Northern) Ireland, Scotland, England	WISE

Polloway, E. A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, 1, 14-18.

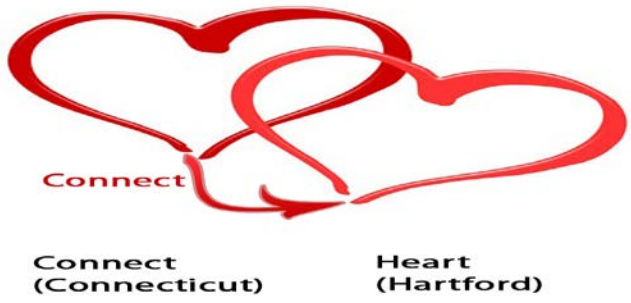
Keywords for Virginia State Capital

Keyword for Virginia is Virgin (Oil).
Keyword for Richmond is Rich-Man.



Keywords for Connecticut State Capital

Keyword for Connecticut is Connect.
Keyword for Hartford is Heart.



Source: Lubin, J., & Polloway, E. A., (2016). Mnemonic instruction in science and social studies for students with learning disabilities: A review. Learning Disabilities: A Contemporary Journal 14 (2), p.210

Graphic Organizer: Two Variant Models

Considerations	Evolution	Creationism (aka Intelligent Design)
Core Focus	Explains variety and complexity of life forms on Earth	Explains origins of earth and life forms
Source of Position	Evidence gleaned from scientific research	Biblical interpretation based on Book of Genesis
Life on Earth	More than 3.5 billion years old	Approximately 6000-10,000 years old based on literal reading of Genesis
Belief system	Scientific method: testable theories supported by multiple lines of evidence	Faith in strict Biblical interpretation and believe in its inerrancy
Implication	Teach scientific method as best means of understanding natural world	Teach creationism as reflection of belief via Biblical interpretation

Polloway, E. A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, p. 140.

Sample Science Acronyms

Category	Data to be Learned	Sample Acronym
Characteristics of living animals	Movement, Reproduction, sensation, Growth, Respiration, Excretion, Environmental Sensitivity, Nutrition	MRS GREEN
Colors of Rainbow	red, orange, yellow, green, blue, indigo, violet	ROYGBIV
Diet for Diarrhea	Bananas, rice, apples, toast	BRAT
Endocrine Glands	pancreas, pituitary, hypothalmus, adrenal, ovaries, testes, thyroid	TOPP HAT
Invertebrate classes	Cnidarians, Annelids, Mollusks, Sponges, Echinoderms, Arthropods	CAM SEA ("calm sea")
Life Cycle Butterfly	Egg, Larva, Pupa, Adult	EL PA ("the father")
Main Insect Body Parts	head, abdomen, thorax	HAT
Newborn Vital Signs (Virginia Apgar)	Activity, Pulse, Grimace, Appearance, Respiration	APGAR
Parts of Atom	protons, electrons, neutrons	PEN
Parts of the Pistil	Stigma, Ovule, Ovary, Style	SO^2S
Plane Takeoff Prep	Controls, Instruments, Gas, Altitude indicator, Radio	CIGAR
Parts of Seed	Seed Coat, Embryo, Endosperm	SCEE ("see")
Four types of wounds	crush, laceration, incision, puncture	CLIP
Simple Machines	Pulley, gear, jackscrew, axle and wheel, inclined plane, lever	PG JAIL
Stroke Warning	Face: does one side droop? Arm: does one drift downward, cannot be raised? Speech: sound slurred or strange? Time: identify time of symptom Call 911 immediately	FAST…. as in Think FAST
Vertebrate Classes	Fish, amphibians, reptiles, mammals, birds	FARM-B

Polloway, E. A., & Lubin, J. (2017). Graphic models and instructional tools for students with special needs. Lynchburg College Journal of Special Education, p. 14.

Sample Science Acrostics

Category	Data to be Learned	Sample Acrostic/s
Colors of Rainbow	red, orange, yellow, green, blue, indigo, violet	Riding on your grandmothers' bike (that) is violet.
Layers of the Earth	Crust, Mantle, Core (inner), Core (outer)	CMC^2
Lifecycle of cells	interphase, prophase, metaphase, anaphase, telophase, cytokinesis	Icy penguins make Antarctica too cold.
Metrics	Metric prefixes: kilo-, hecto-, deca-, (base), deci-, centi-, milli-	King Henry's deeds brought deep cheers to many.
Order of Mohs Hardness Scale	talc, gypsum, calcite, fluoride, apatite, orthoclase feldspar, quartz, topaz, corundum, diamond	Texas girls can fly and other quiet things can do.
Parts of the Flower	stamen, pistil, receptacle, sepal, petal	Sister Paula received six prizes.
Plant Life Cycle	seed, seedling, flower, mature plant	Some singers frequent music places.
Properties of matter	Mass, density, volume, weight	Monkeys dance very well
Scientific Method	Problem, Research, Form hypothesis, Test hypothesis, Observations, Conclusion	People run faster than old chimps!
Scientific Method	Observe, Inquire, Hypothesize, Experiment, Conclude	Only Ilene has eight cats.

Category	Data to be Learned	Sample Acrostic/s
Simple Machines	Pulley, gear, wheel, inclined plane, lever	Poor Gary wants ice-cream low-fat
Solar System (planets small to large)	Mercury, Mars, Venus, Earth, Neptune, Uranus, Saturn, Jupiter	Men March to VENUS Joyfully.
Solar System planets in sequence (after Pluto's demise)	Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune (Pluto)	My Very Eager Mother Just Served Us Nachos (but not Peanuts)
Taxonomic Classification	kingdom, phylum, class, order, family, genus, species	King Phillip came over for great soup.
Types of Environmental Pollution	Air, Thermal, Water, Visual, Land, Noise, Light	Altogether, Tom's wife, Victoria, learned nine languages.

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