

# The Science of Writing

Young-Suk Grace Kim

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# Grade 1 Sample: Student A, planning and writing before

2017-2018 | SRSD+

Grade 1 Student Response Form

Pre-Test

ID LABEL  
110106 B

## Task 1: Writing B Animal Tails

**Essay prompt:**

Explain why animals have tails.

**Planning:**

2017-2018 | SRSD+

Grade 1 Student Response Form

Pre-Test

ID LABEL  
110106 B

## Task 1: Writing B Animal Tails

**Essay prompt:**

Explain why animals have tails.

**Your essay:**

all animals have  
tails.

Some animals live in the  
wild.

All animals have tails. Some  
animals live in the wild.

# Grade 1 Sample: Student A, after SRSD+ instruction

## Essay prompt:

Explain why hair is important to our bodies.

## Your essay:

Do you know how hair can protect you? First, it can keep you from getting a sunburn. Next, don't pull out your hair. Third, hair keep you warm. Last, hair can change color too. So go and look in the mirror and see your hair!

Do you know how hair can protect you? First, it can keep you from getting a sunburn. Next, don't pull out your hair. Third, hair keeps you warm. Last, hair can change color too. So, go and look in the mirror and see your hair!

# Agenda

- Writing process
- Skills & knowledge for writing development
- Effective instructional approaches
  - What & How
  - Sample approach: SRSD+





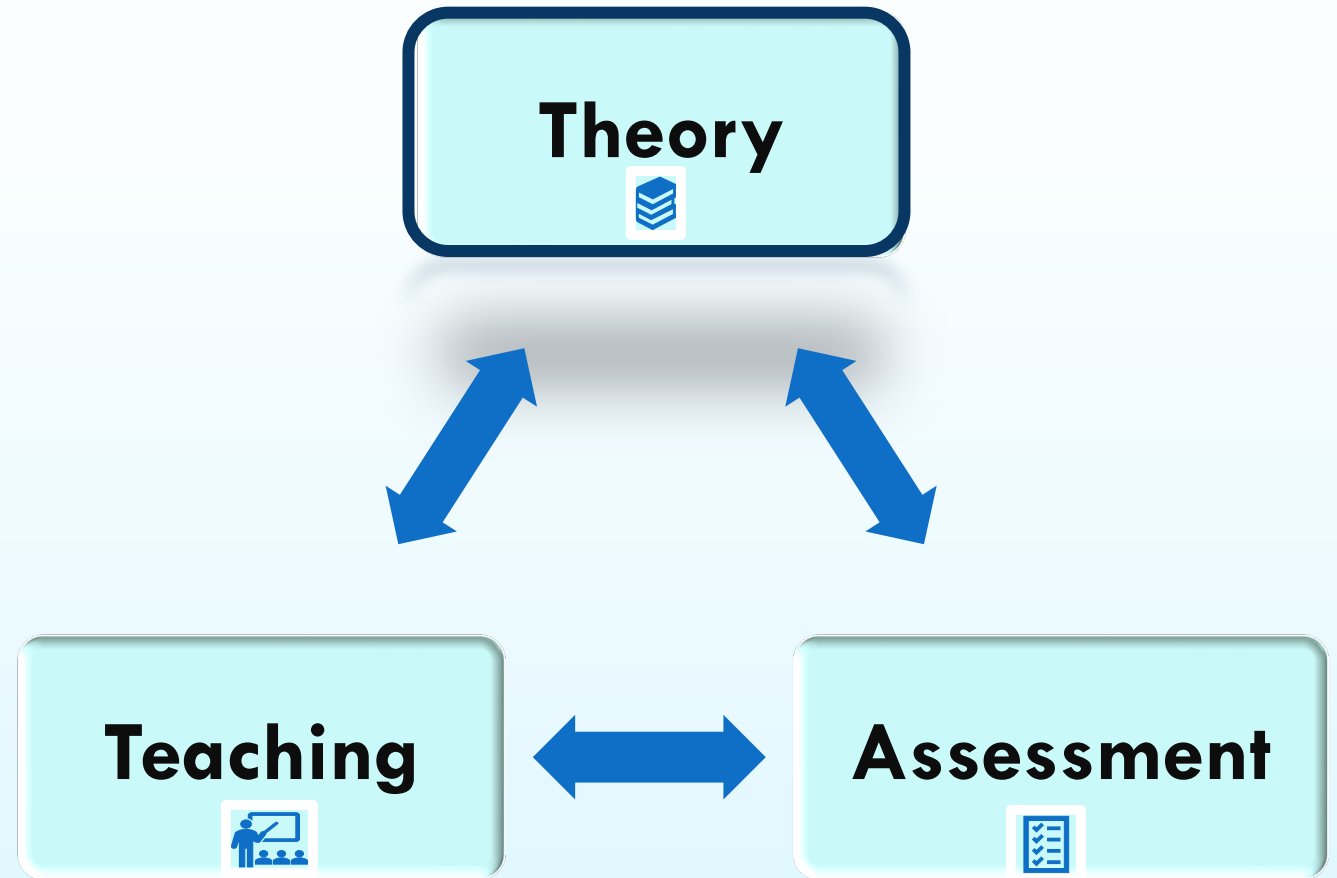
# Power of Writing

- Means of expression and thinking
- Essential for academic achievement and at workplace
- **Support reading development & learning**



# Science of Writing

## Three Elements

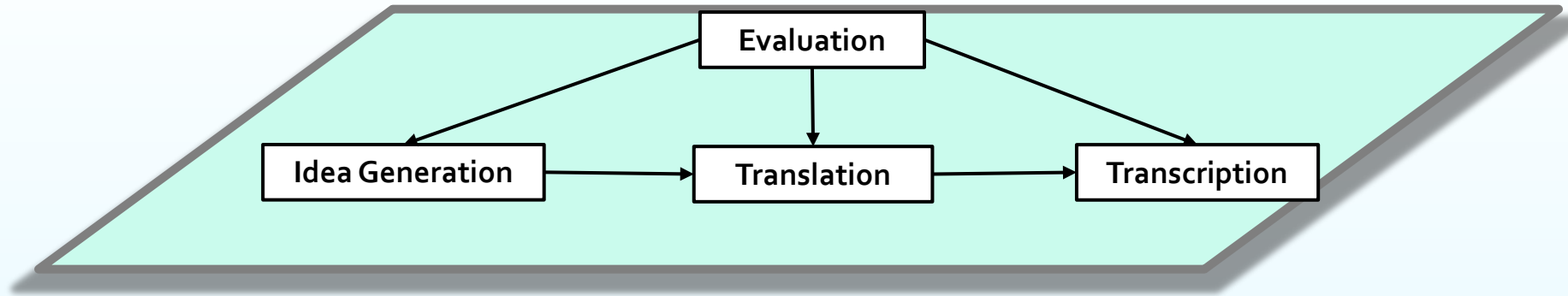


# Write About



# Writing: Process

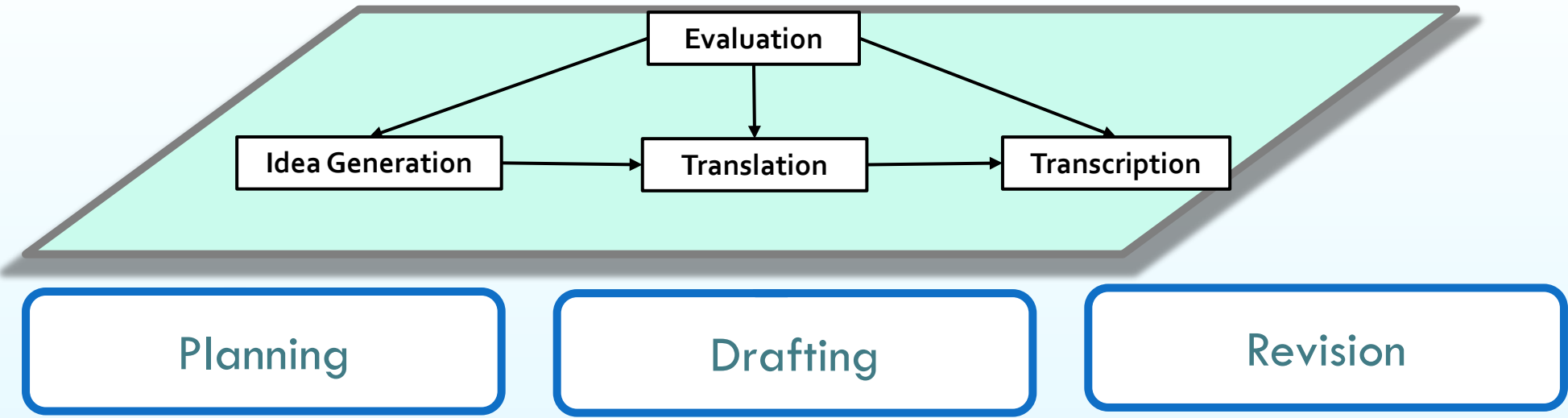
Writing  
Process





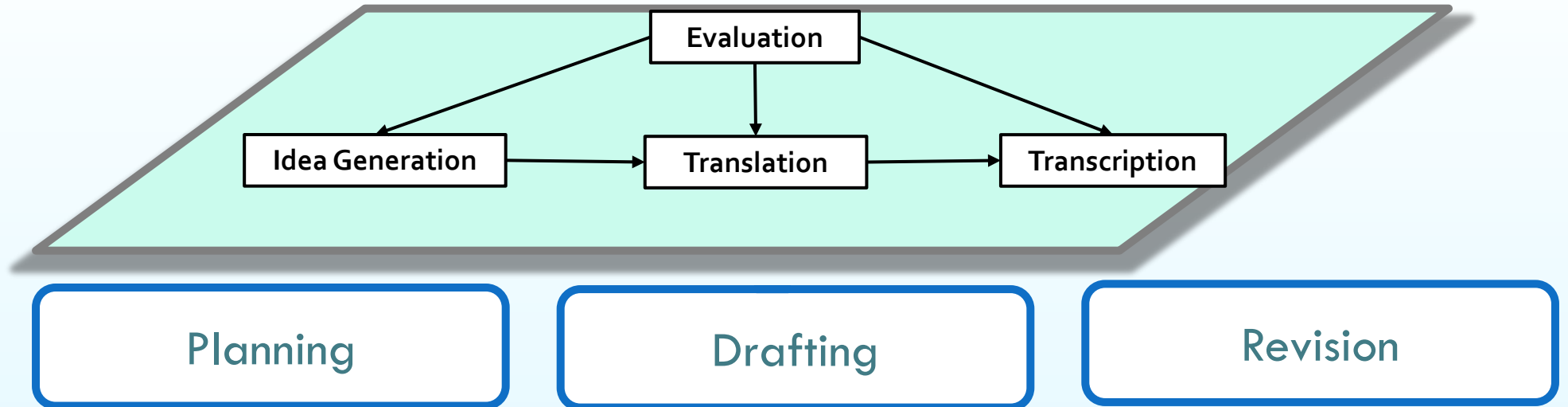
# Writing: Process

Writing  
Process



# Writing: Process

Writing  
Process

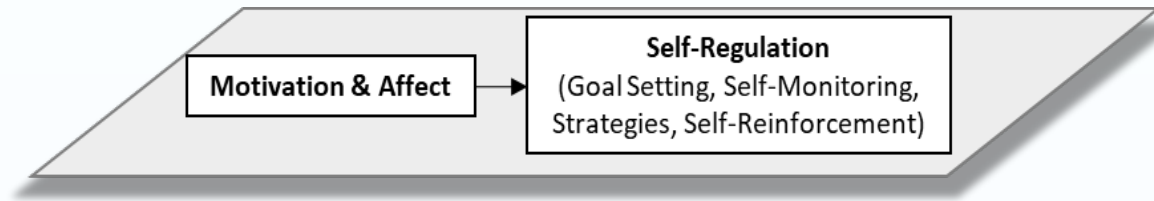


skills and knowledge you drew on  
for the writing process?

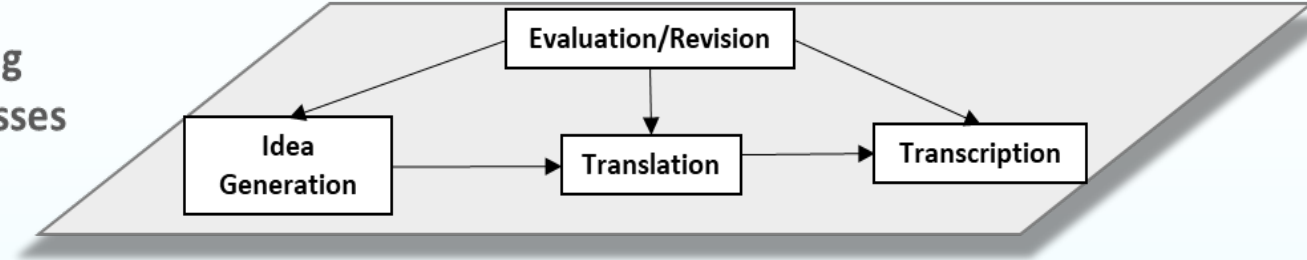
# DI EW

Direct and Indirect Effects  
model of Writing

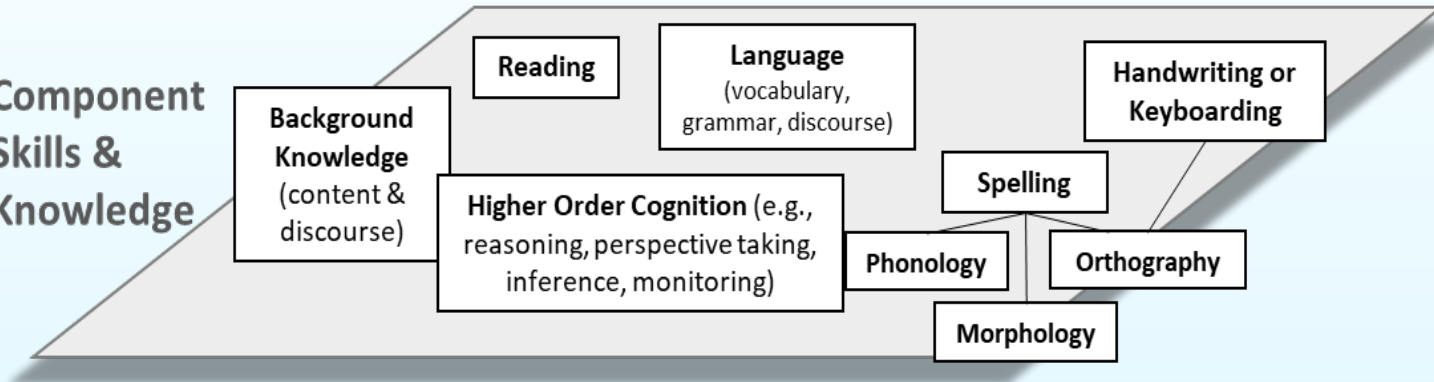
## Socio-Emotion & Regulation



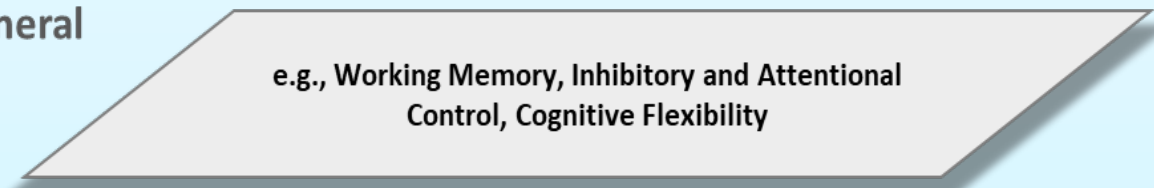
## Writing Processes



## Component Skills & Knowledge



## Domain-general Cognitions (Executive Function)



Adapted from

Kim & Graham, 2022

# DI EW

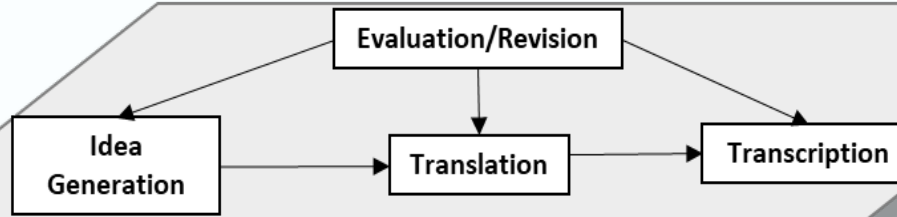
Direct and Indirect Effects  
model of Writing

## Socio-Emotion & Regulation

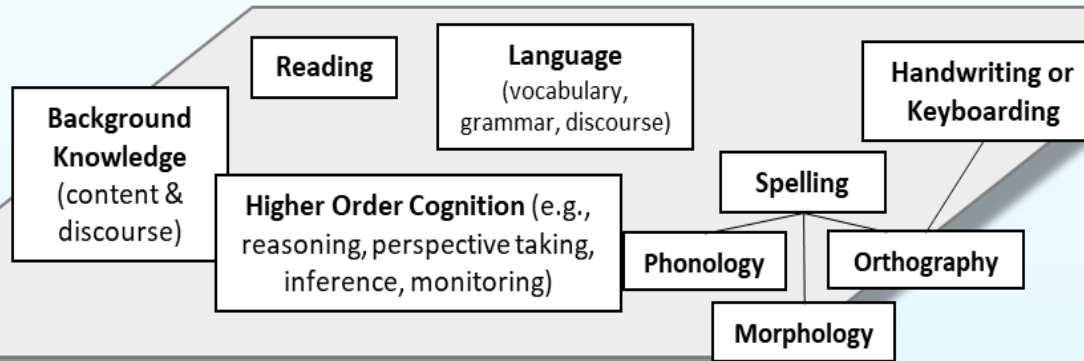
Motivation & Affect

Self-Regulation  
(Goal Setting, Self-Monitoring,  
Strategies, Self-Reinforcement)

## Writing Processes



## Component Skills & Knowledge



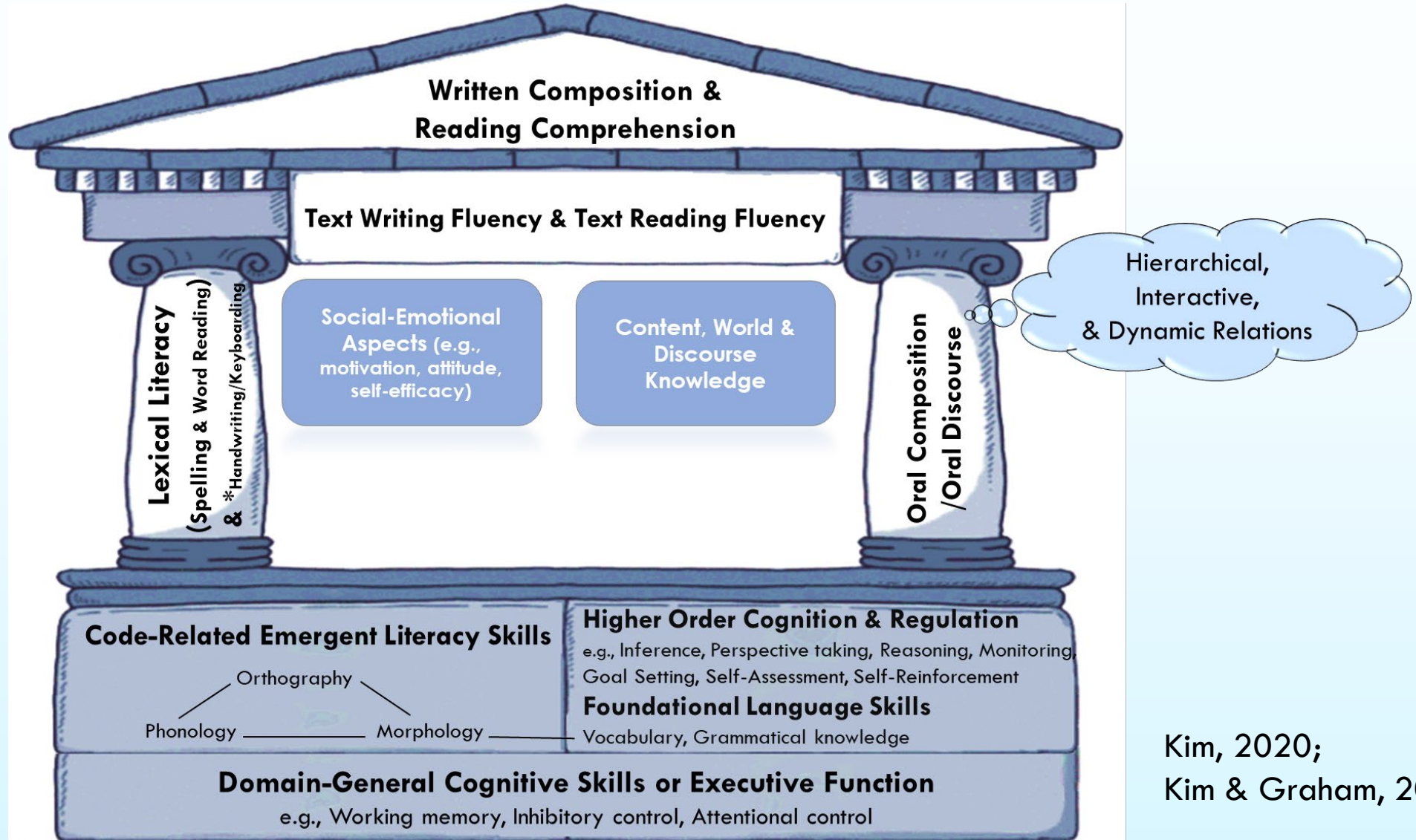
## Domain-general Cognitions (Executive Function)

e.g., Working Memory, Inhibitory and Attentional  
Control, Cognitive Flexibility

Adapted from

Kim & Graham, 2022

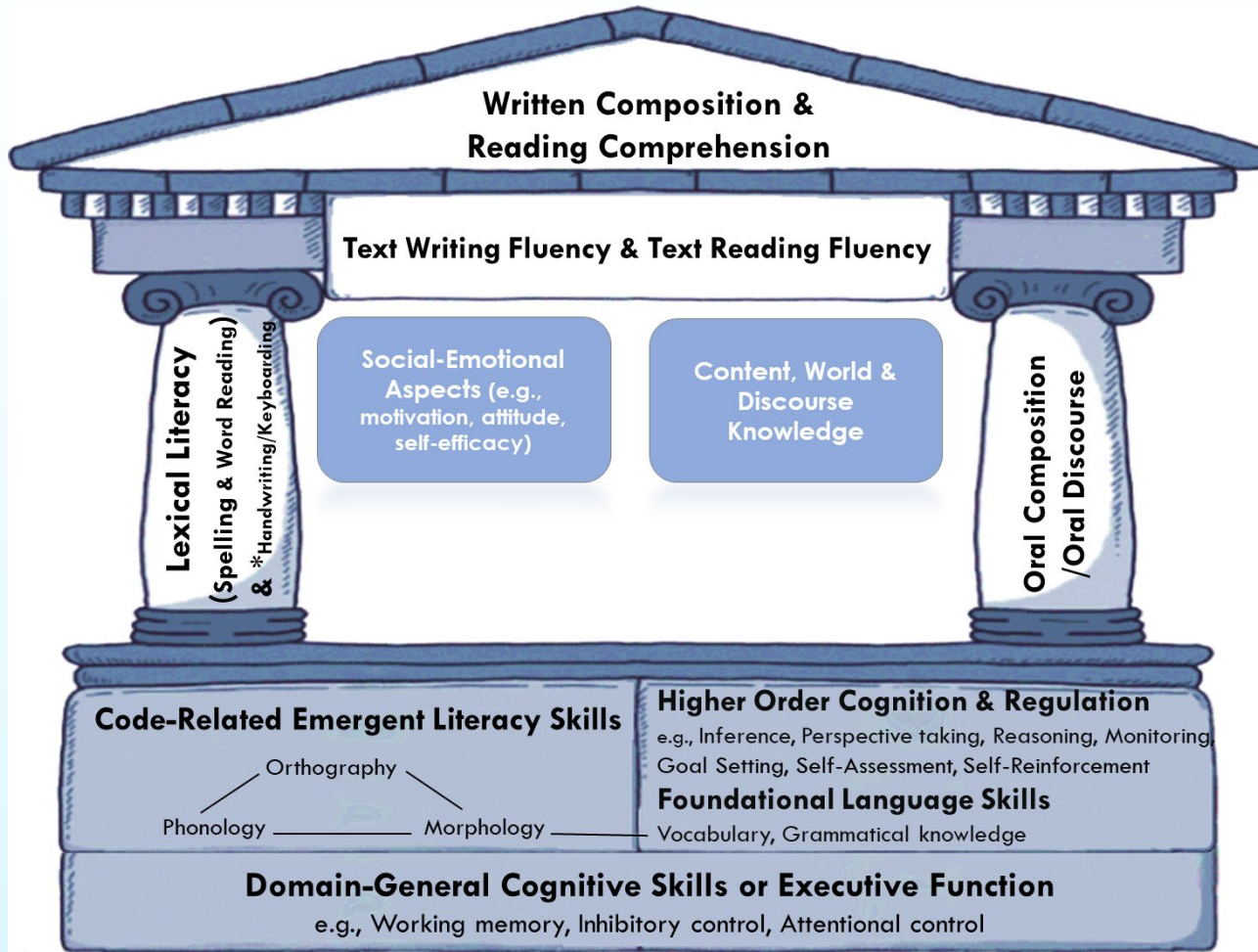
## Component Skills & Knowledge



\*only relevant to written composition

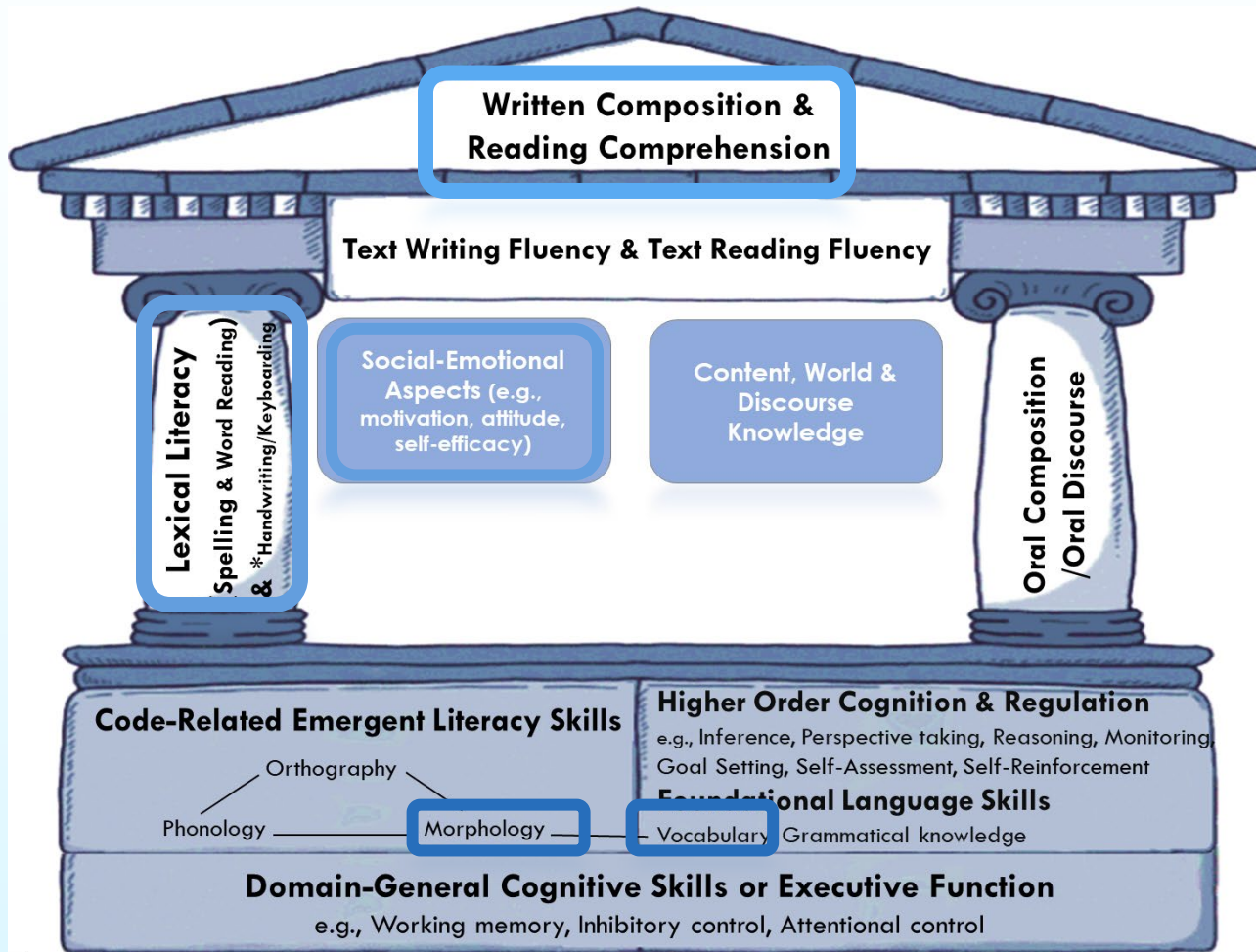
Kim, 2020;  
Kim & Graham, 2022

## Hierarchical Relations



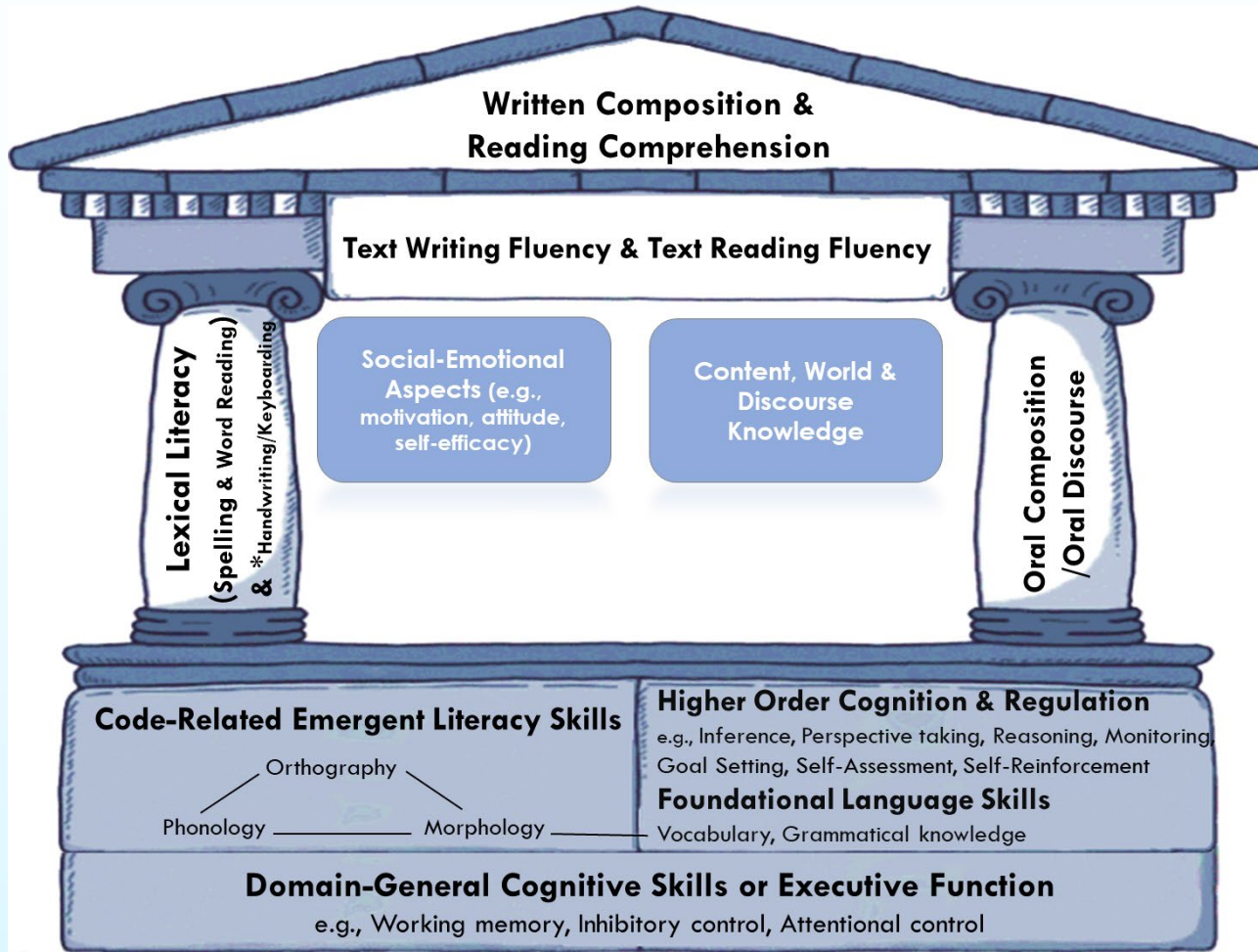
\*only relevant to written composition

- Lower order skills are necessary and are the foundations for higher order skills—skills build on each other
- Difficulties in low order skills cause a chain of influences.
- A series of interconnections



Skills develop *bidirectionally*, mediated by learning experiences.

\*only relevant to written composition



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## Differential contributions due to

### ● Development

- in the beginning phase: large constraining role of transcription skills

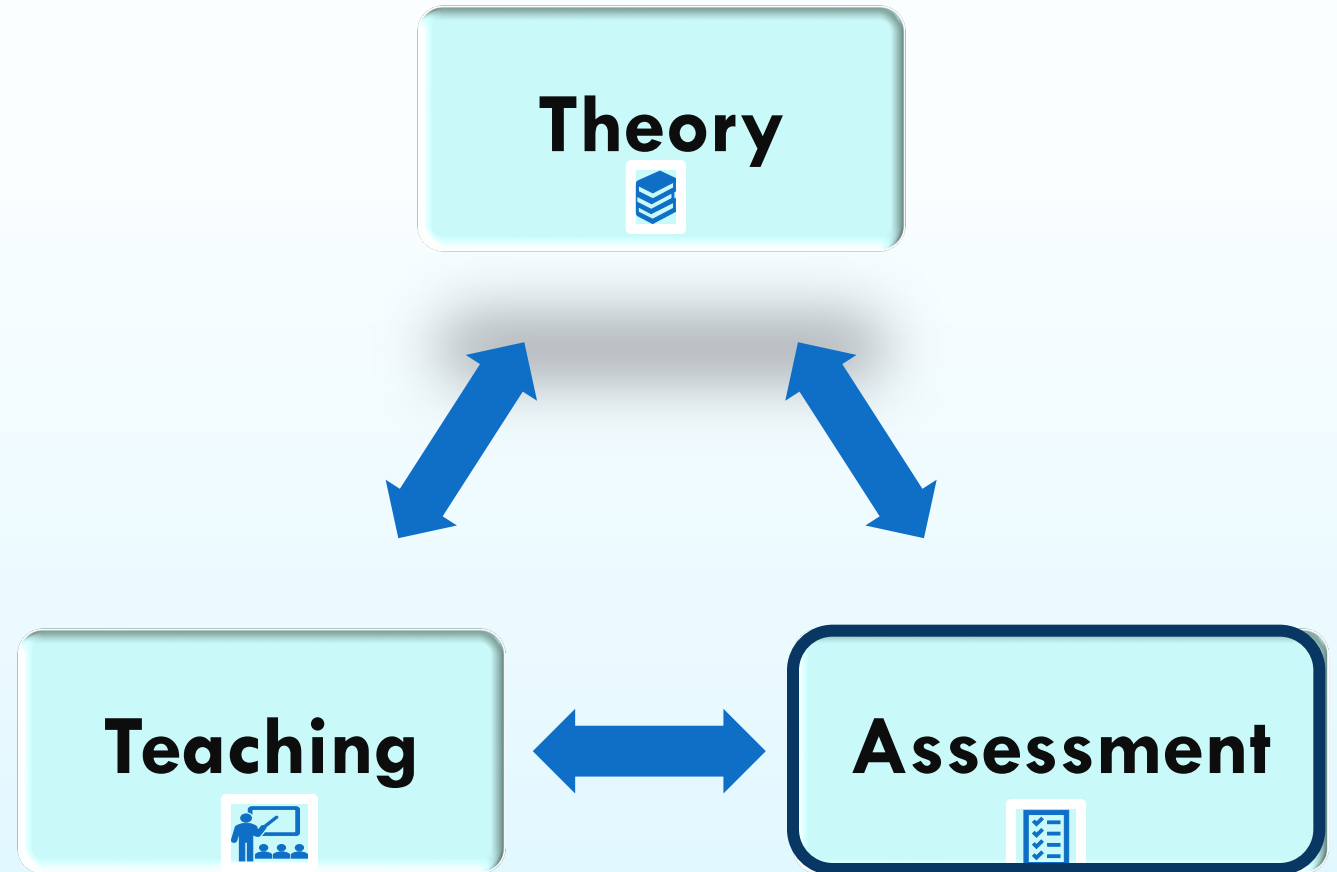
### ● Measurement

- E.g., What you are looking for in writing



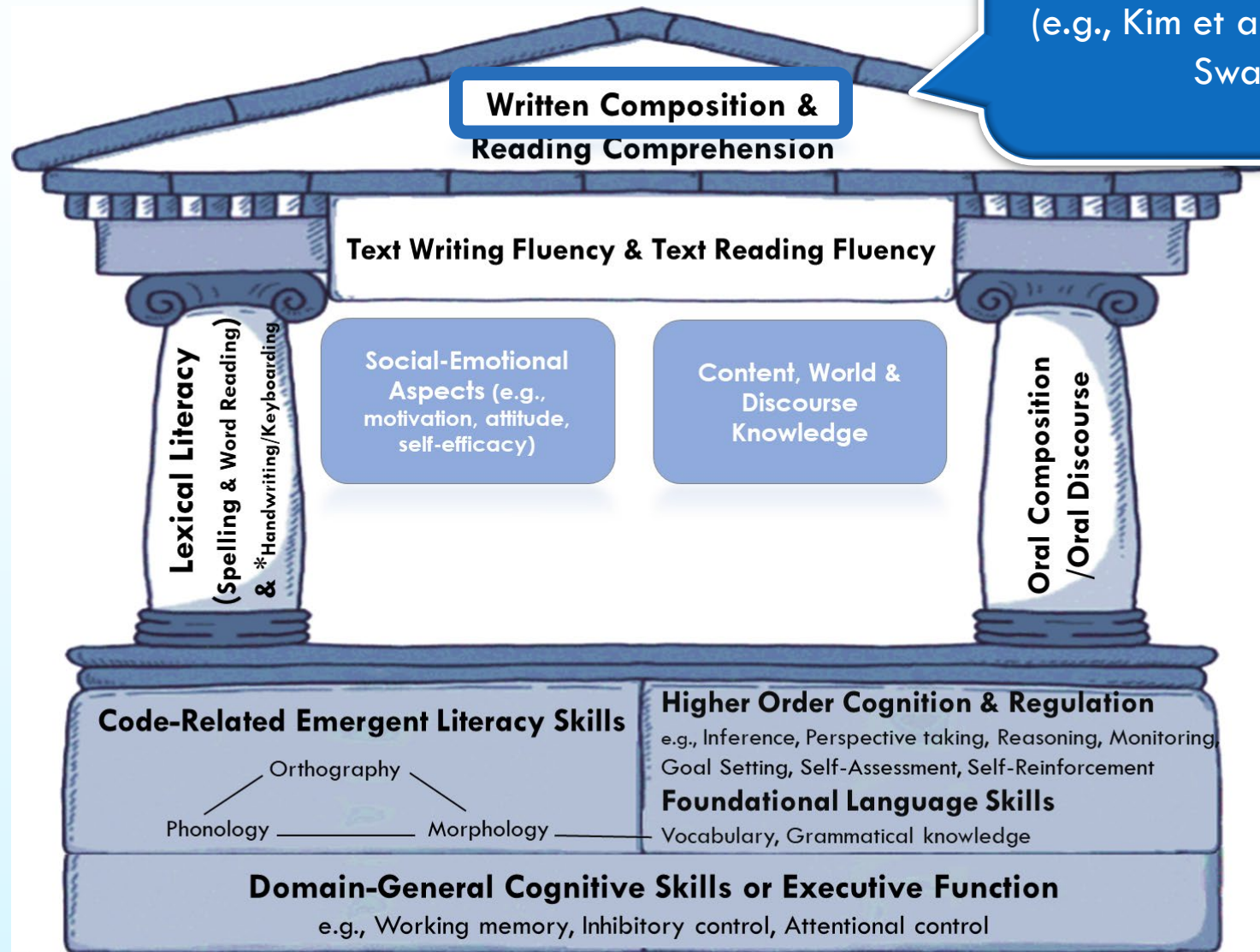
# Science of Writing

## Three Elements



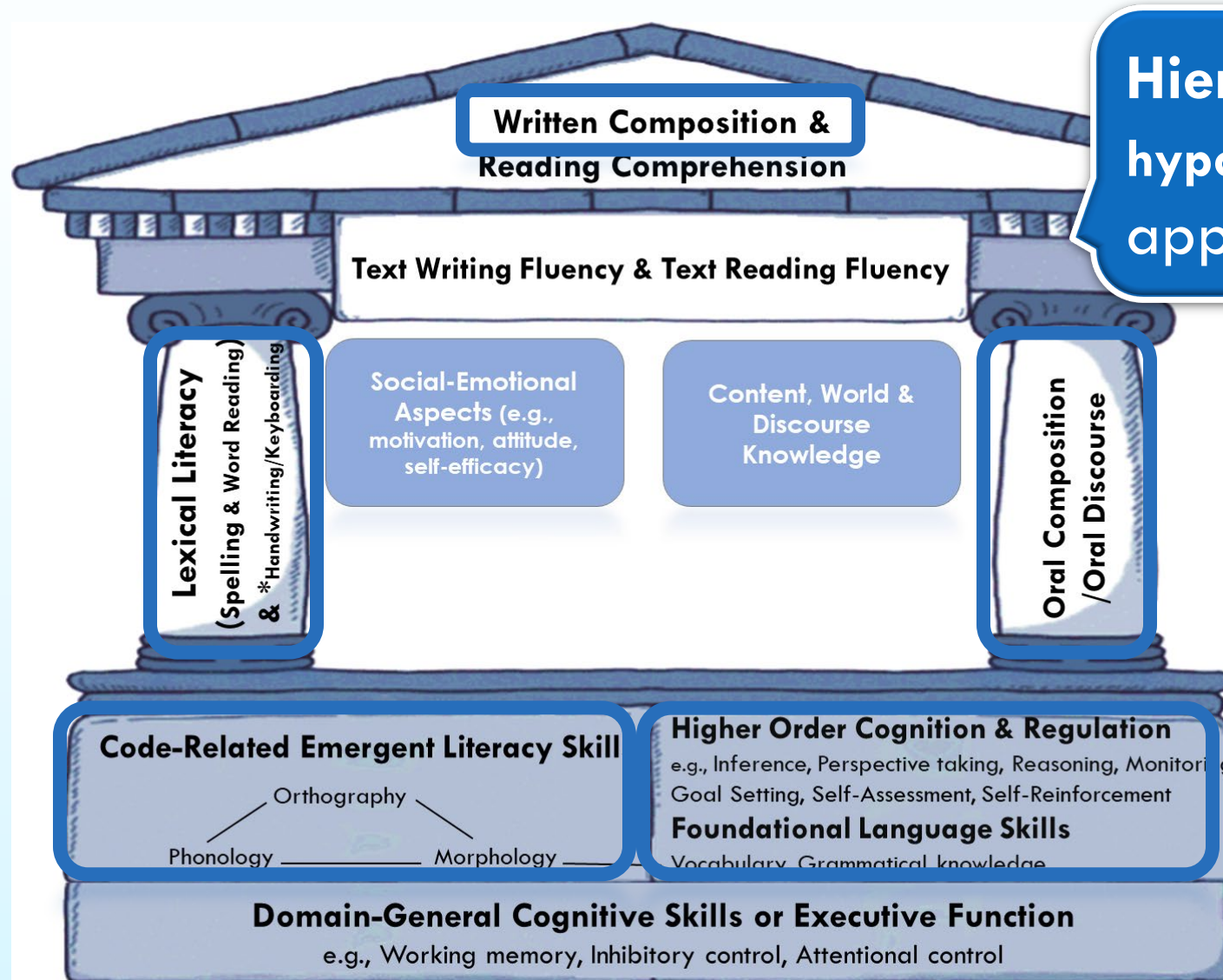
# What to Assess

Multiple genres & tasks  
(e.g., Kim et al., 2017; Schoonen, 2012;  
Swartz et al., 1999)



\*only relevant to written composition

# What to Assess

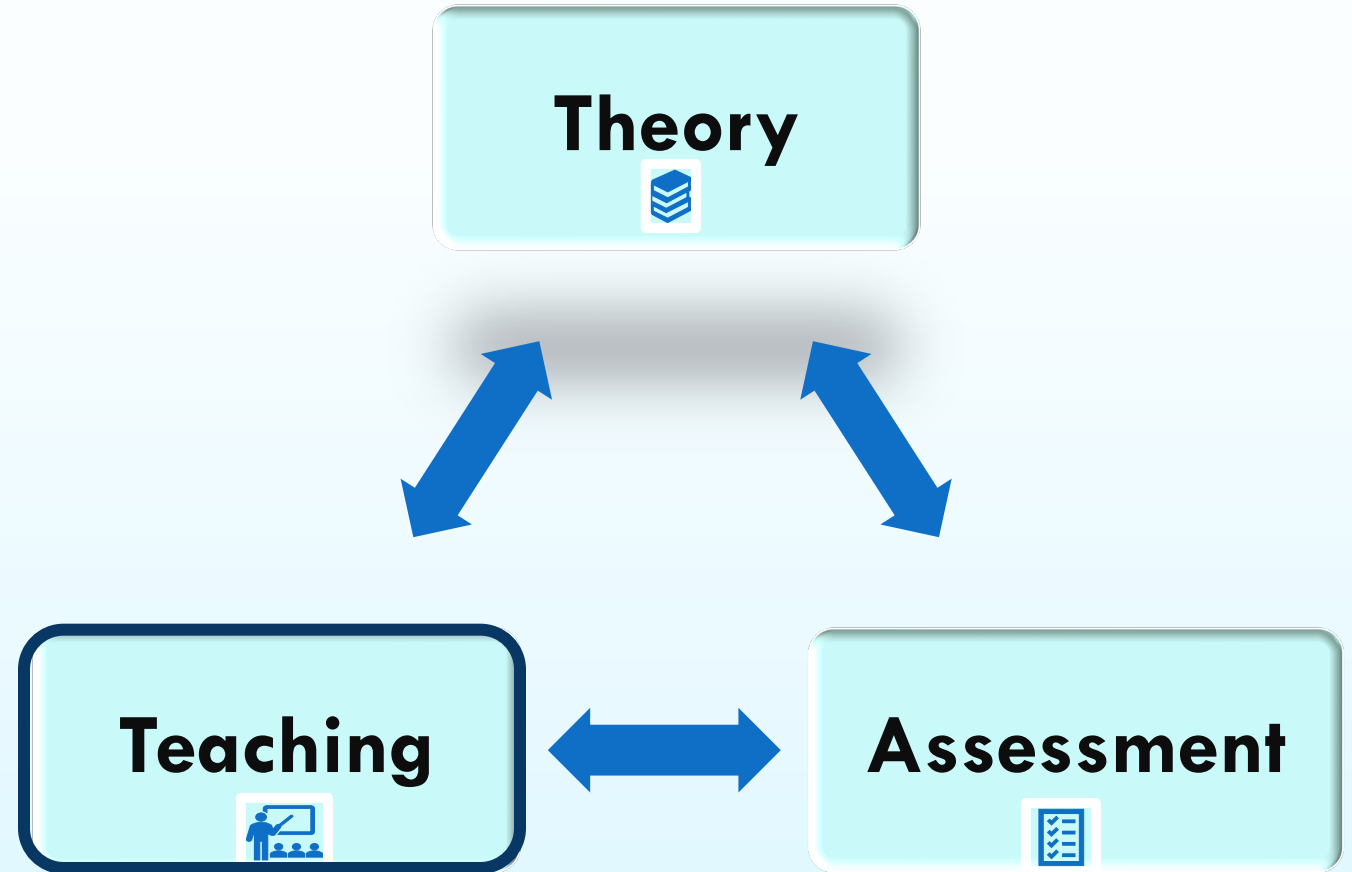


Hierarchical relations hypothesis: Systematic approach

\*only relevant to written composition

# Science of Writing

## Three Elements



# Effective Writing Instruction

## 1. No single silver bullet: Multicomponent skills

2. Multiple genres and tasks (purposes)

3. Writing process

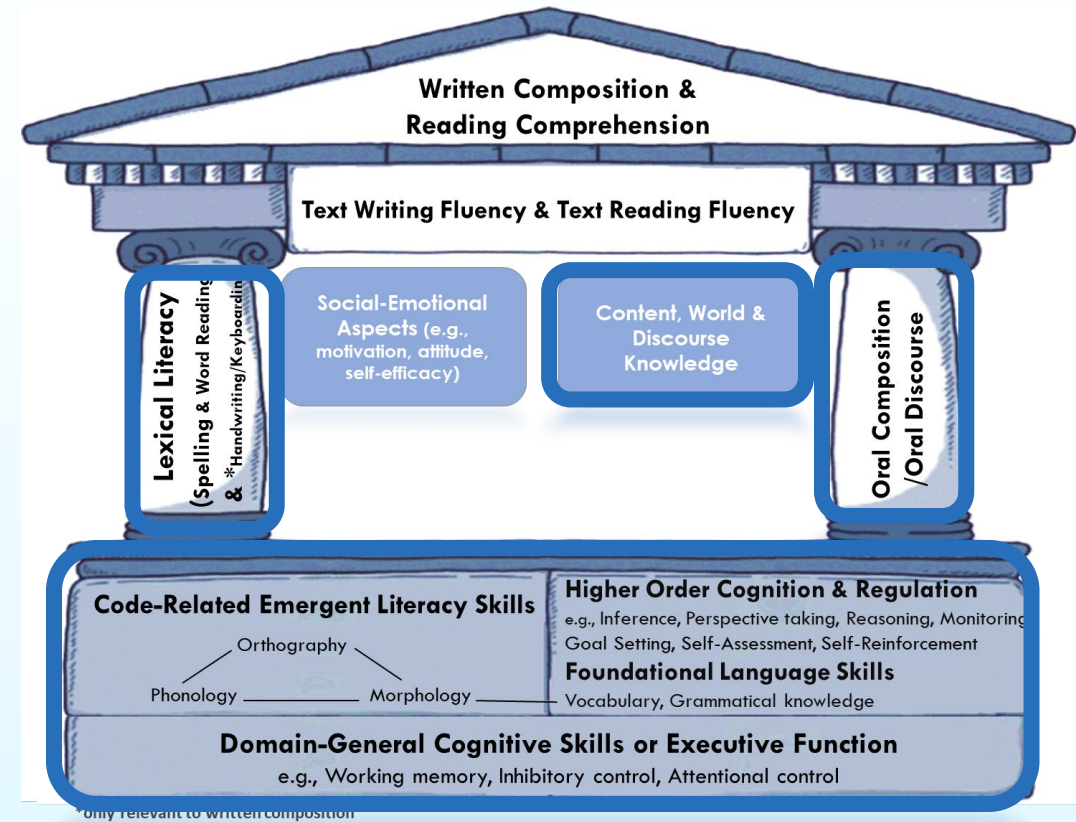
- Setting goals, planning, revising, and associated strategies (e.g., tapping prior knowledge, monitoring, summarizing, asking questions)

4. Integrate with reading instruction



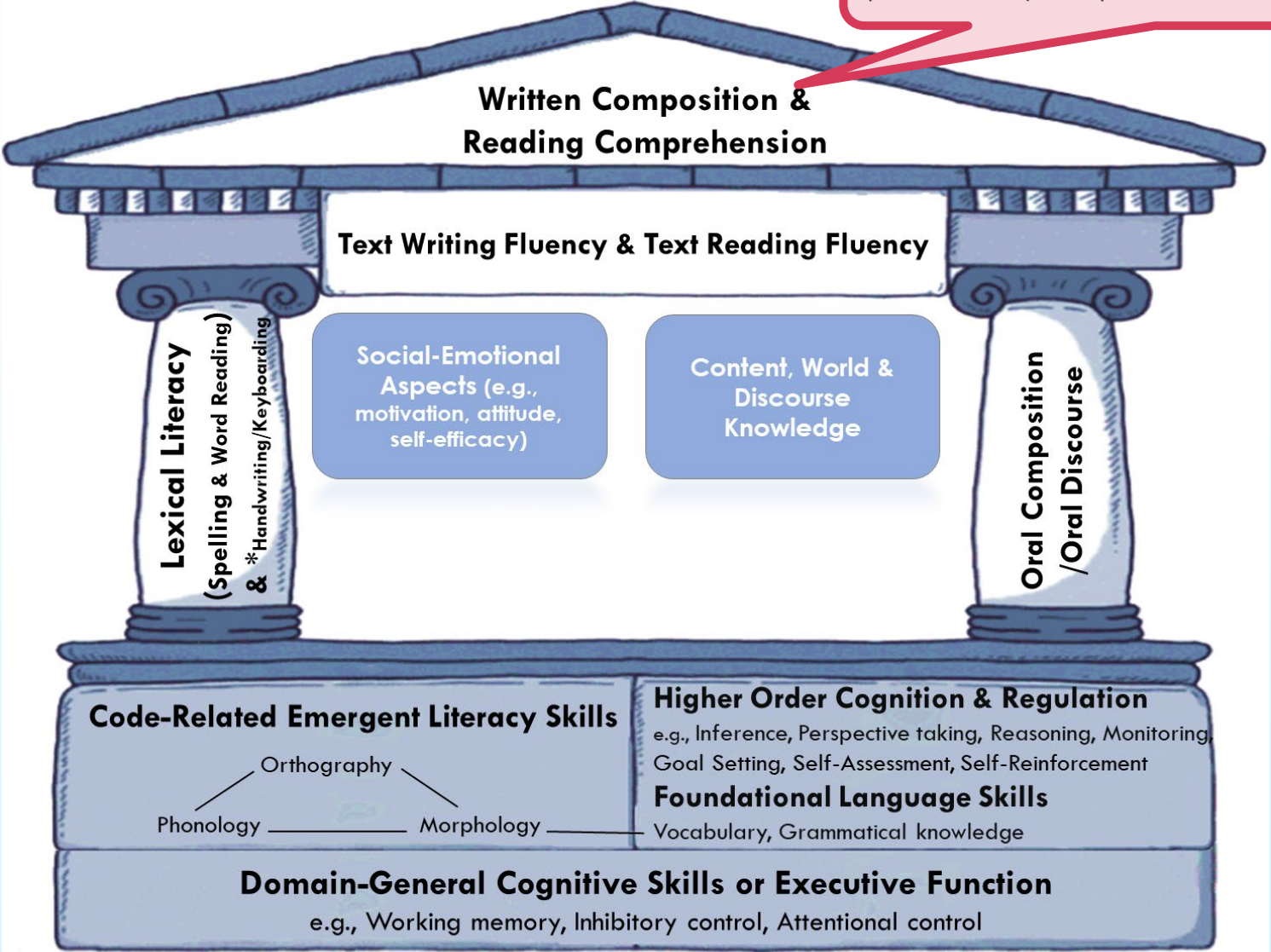
# Effective Writing Instruction

- Teach **foundational skills** such as language skills, spelling, handwriting /keyboarding skills, thinking skills (higher order cognition)
- Prevention of writing difficulties



# Effective Writing Instruction

Comprehensive writing programs: .42  
(Graham et al., 2012)



\*only relevant to written composition

# Effective Writing Instruction

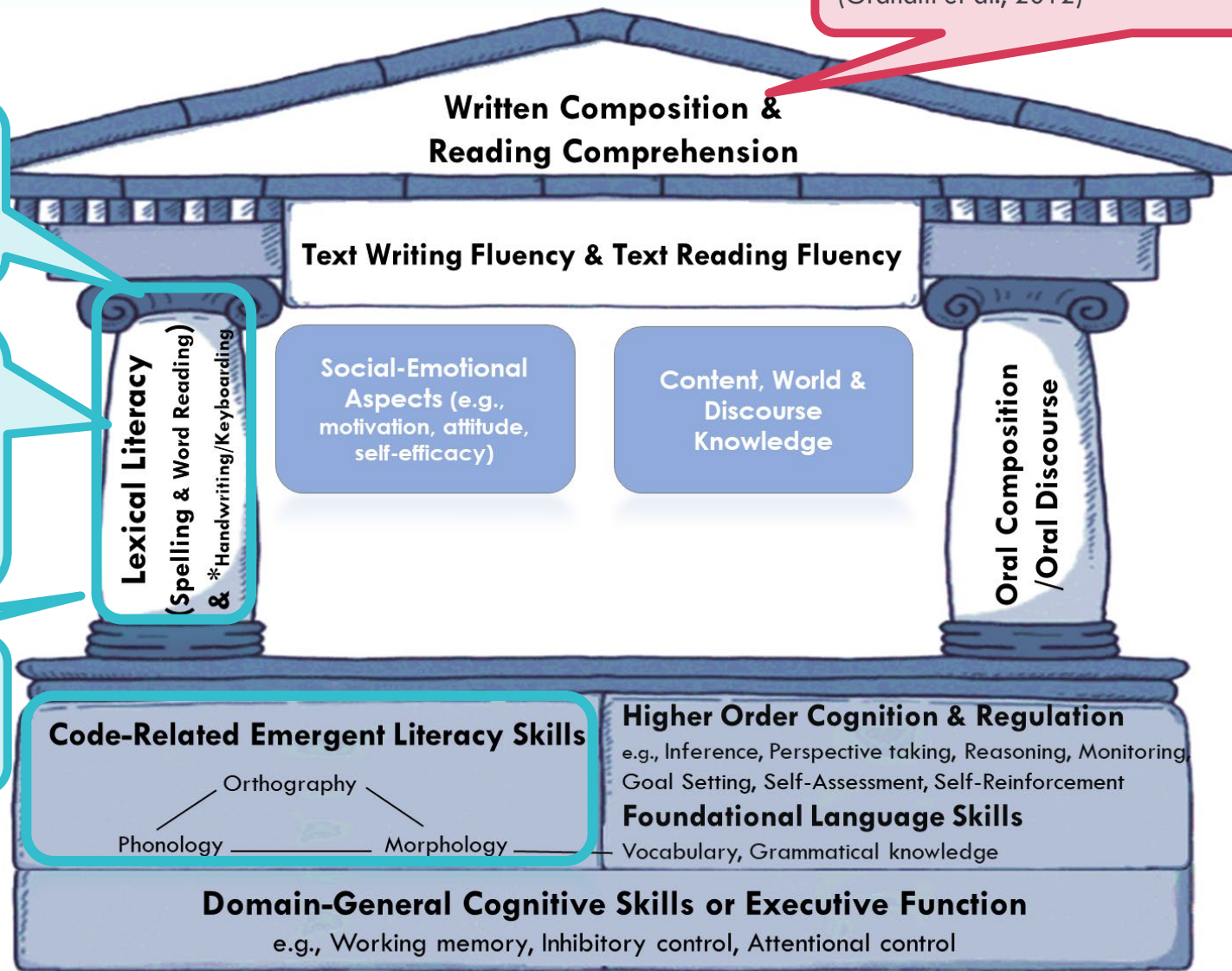
Comprehensive writing programs: .42  
(Graham et al., 2012)

Spelling Instruction: .94 for spelling in writing (Graham & Santangelo, 2014, but see Kim et al., 2021)

Handwriting instruction (.84 for quality; 1.33 for productivity; .48 for fluency) (Santangelo & Graham, 2016)

Word Processing (Graham et al., 2012; Graham & Perin, 2007)

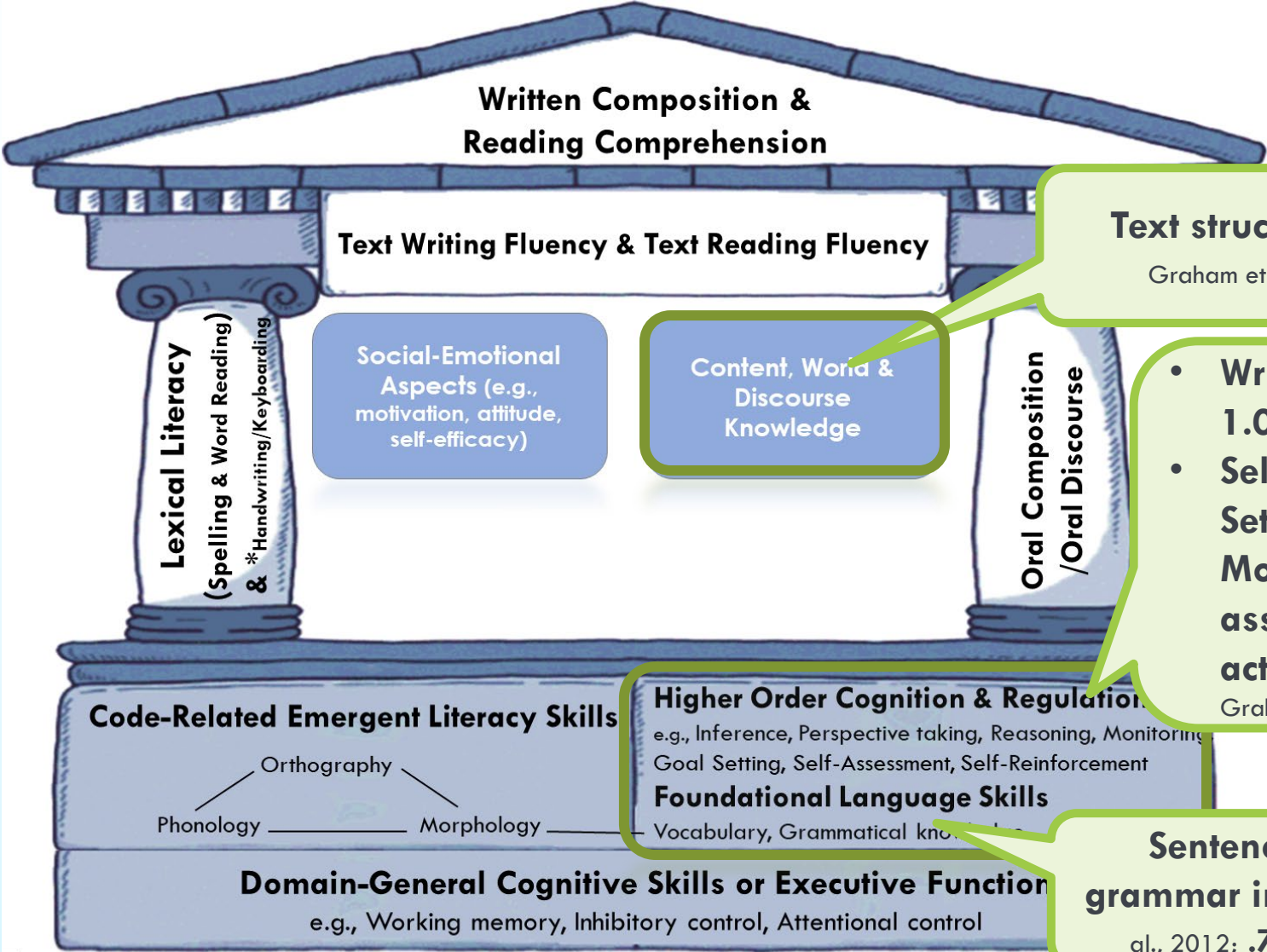
More effective when **combined with composing** (Berninger et al., 2002).



\*only relevant to written composition



# Effective Writing Instruction



**Text structure (.59;**  
Graham et al., 2012)

- **Writing strategies (.82 to 1.02)**
- **Self-regulation strategies: Setting goals (.76) & Monitoring & self-assessment; corrective actions** (Graham et al., 2012; Graham & Perin, 2007)

**Sentence instruction (.73), grammar instruction (-.41** Graham et al., 2012; **.77** Graham, Kim et al., 2024)

\*only relevant to written composition

# Effective Writing Instruction

1. **No single silver bullet: Multicomponent skills**

## 2. **Multiple genres and tasks**

- Narrative & informational (subgenres)
  - Genre-specific aspects (e.g., text structure, expression)
- Types of tasks:
  - Source-based writing & nonsource-based
  - Different goals and forms
    - e.g., stories, reports, letters, note-taking

3. **Writing process**

- Setting goals, planning, revising, and associated strategies (e.g., tapping

# Effective Writing Instruction

1. No single silver bullet: Multicomponent skills

2. Multiple genres and tasks (purposes)

## 3. Writing process

- Planning, first draft, revising
- Associated strategies (e.g., setting goals, tapping prior knowledge, graphic organizers, monitoring, summarizing, asking questions)

**Writing Process:** .40 (Graham et al., 2012) & .32 (Graham & Perin, 2007)

**Prewriting activities (semantic maps, brainstorming; .54)**

**Feedback (adults, peers, or self) (Graham et al., 2012)**

4. Integrate with reading instruction

# Effective Writing Instruction

## 1. No single silver bullet: Multicomponent skills

## 2. Multiple genres and tasks (purposes)

- Narrative & informational (subgenres)
  - Genre-specific aspects (e.g., text structure, expression)
- Source-based writing & nonsource-based
  - e.g., stories, reports, letters, note-taking

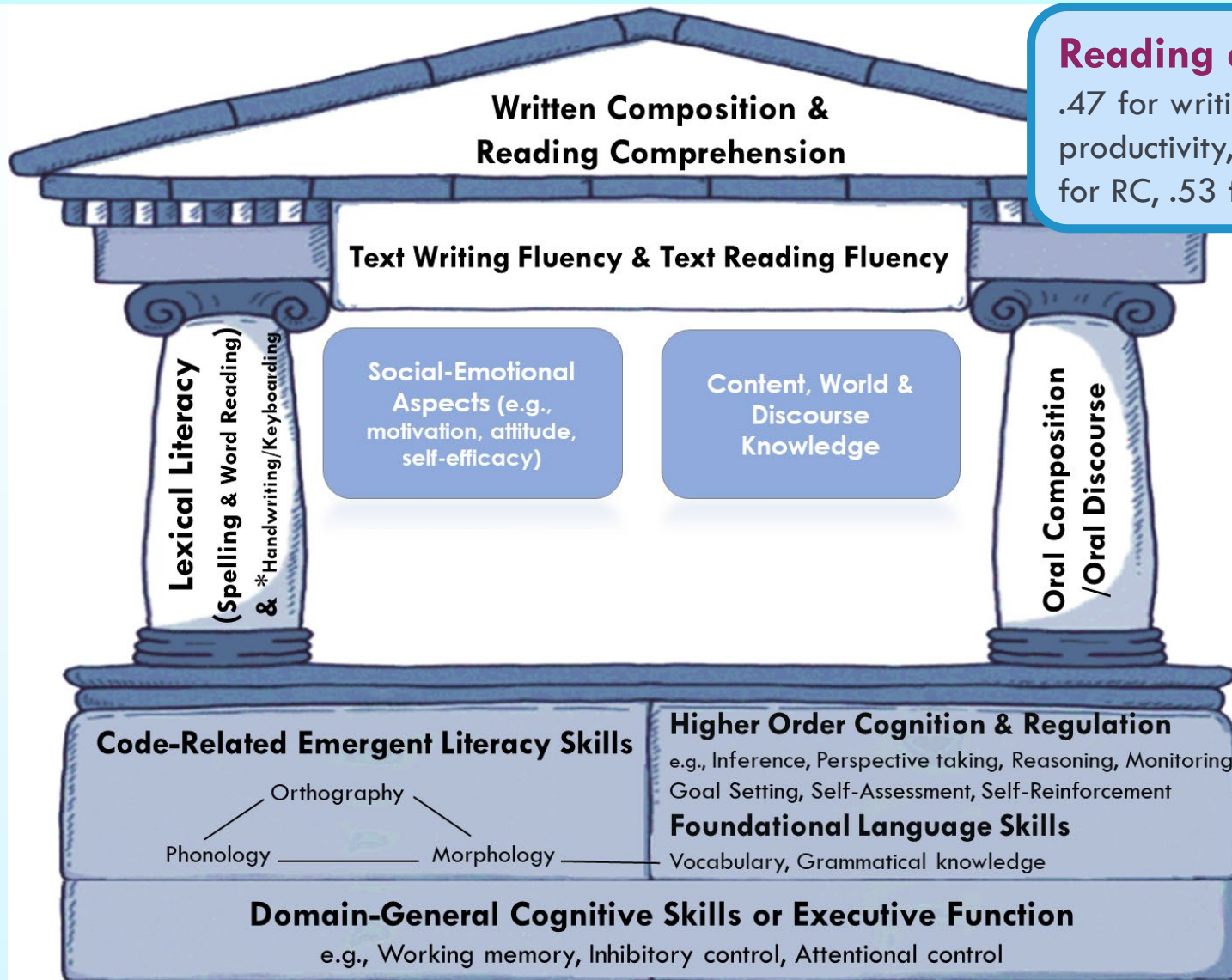
## 3. Writing process

- Setting goals, planning, revising, and associated strategies (e.g., tapping prior knowledge, monitoring, summarizing, asking questions)

# 4. Integrate with reading instruction (Kim, 2020b, 2022a, b;

Kim et al., 2023)

# Effective Writing Instruction: Integrated Instruction



## Reading and Writing together

.47 for writing quality, .69 for writing productivity, .18 for writing mechanics; .39 for RC, .53 for decoding (Graham et al., 2017)

## Make reading-writing connections visible

(Kim, 2022a, b; Kim et al., 2023; Kim & Zagata, 2024)

## Word Reading & Spelling

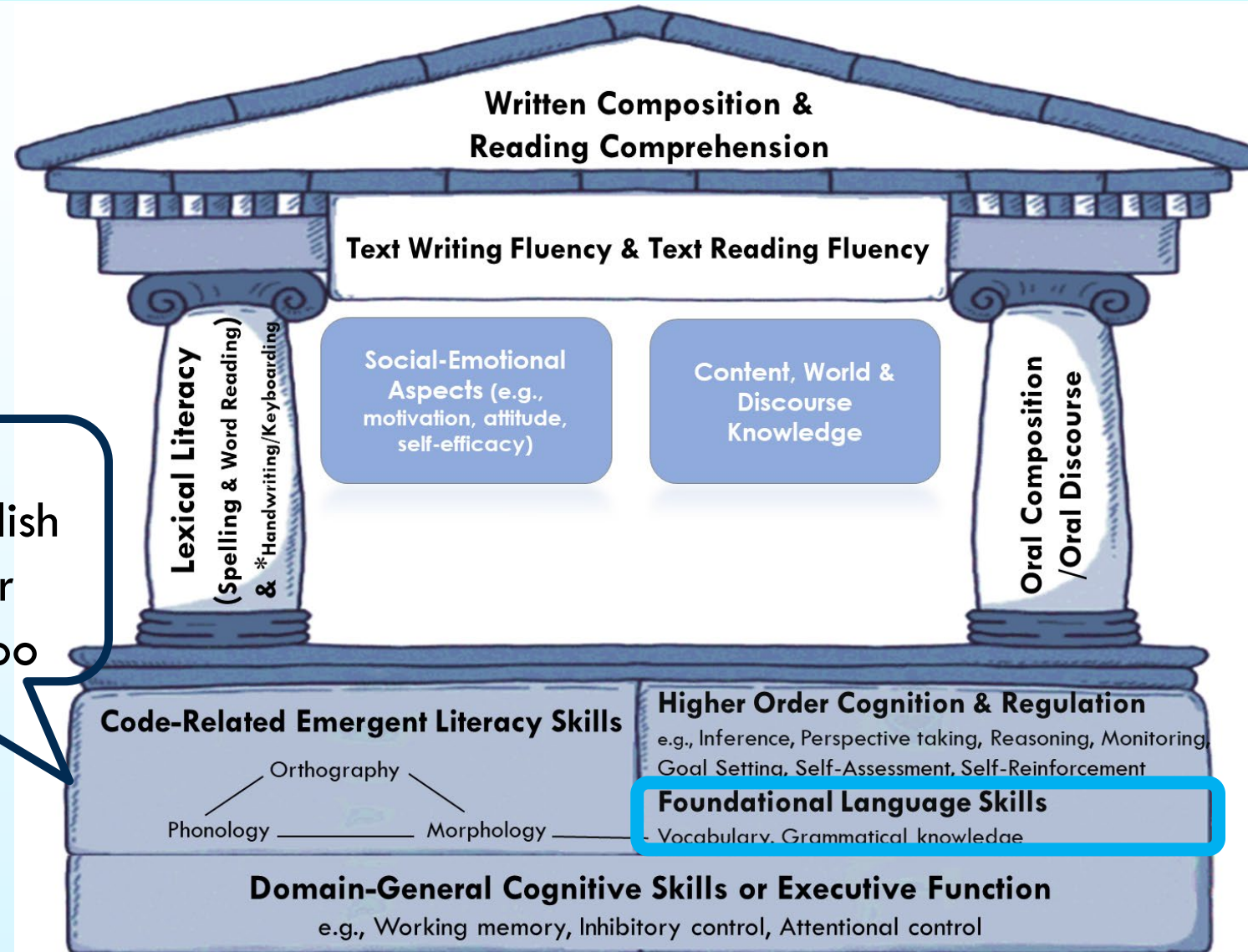
- e.g., word building

## Reading Comprehension & Written Composition

- Incorporating writing opportunities in reading instruction
- Integrating reading materials into writing instruction

\*only relevant to written composition

# Effective Writing Instruction: English Learners

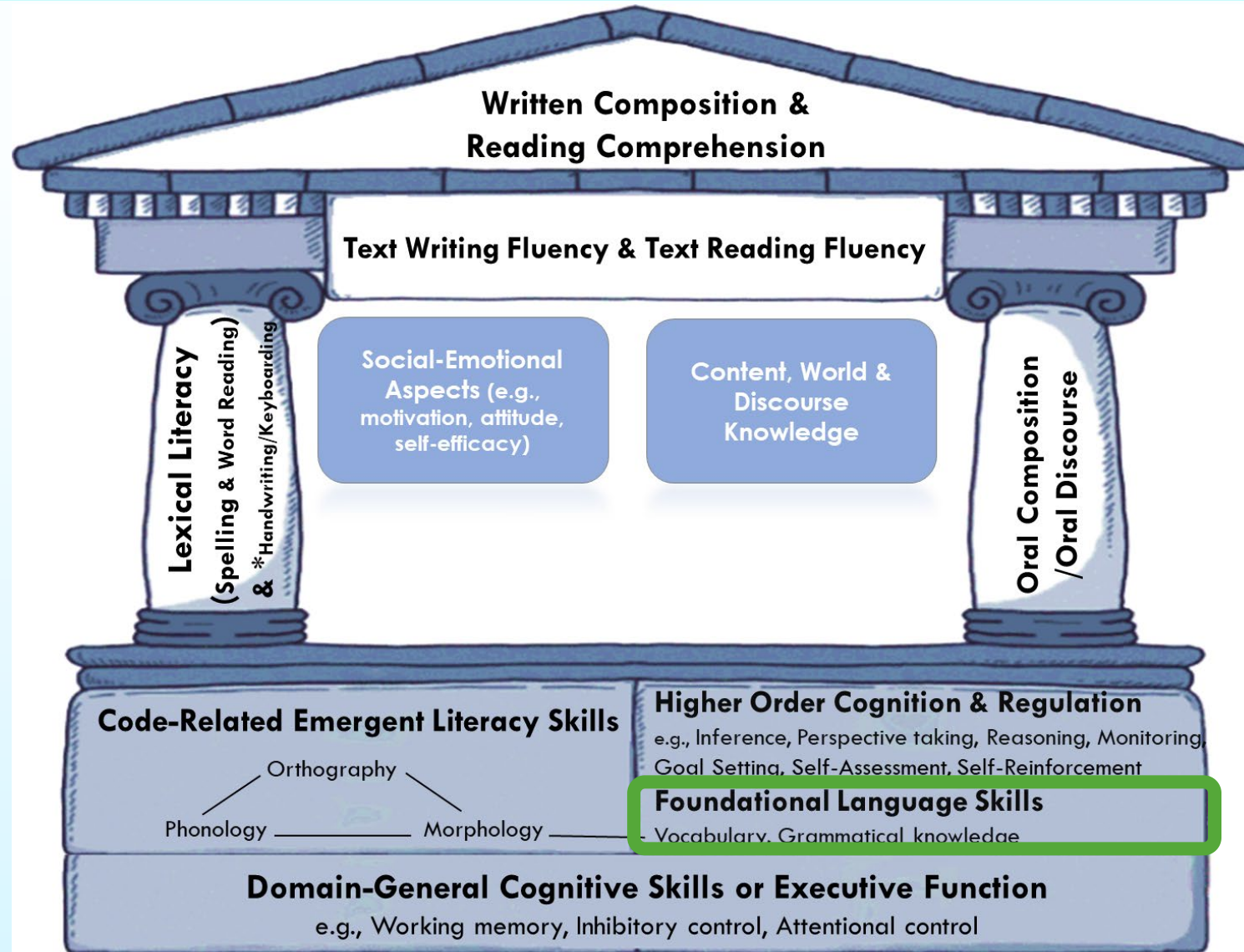


Systematic instruction in English is as effective for this population too

Leverage L1 resources (e.g., content knowledge)

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# Effective Writing Instruction: Learning Disabilities



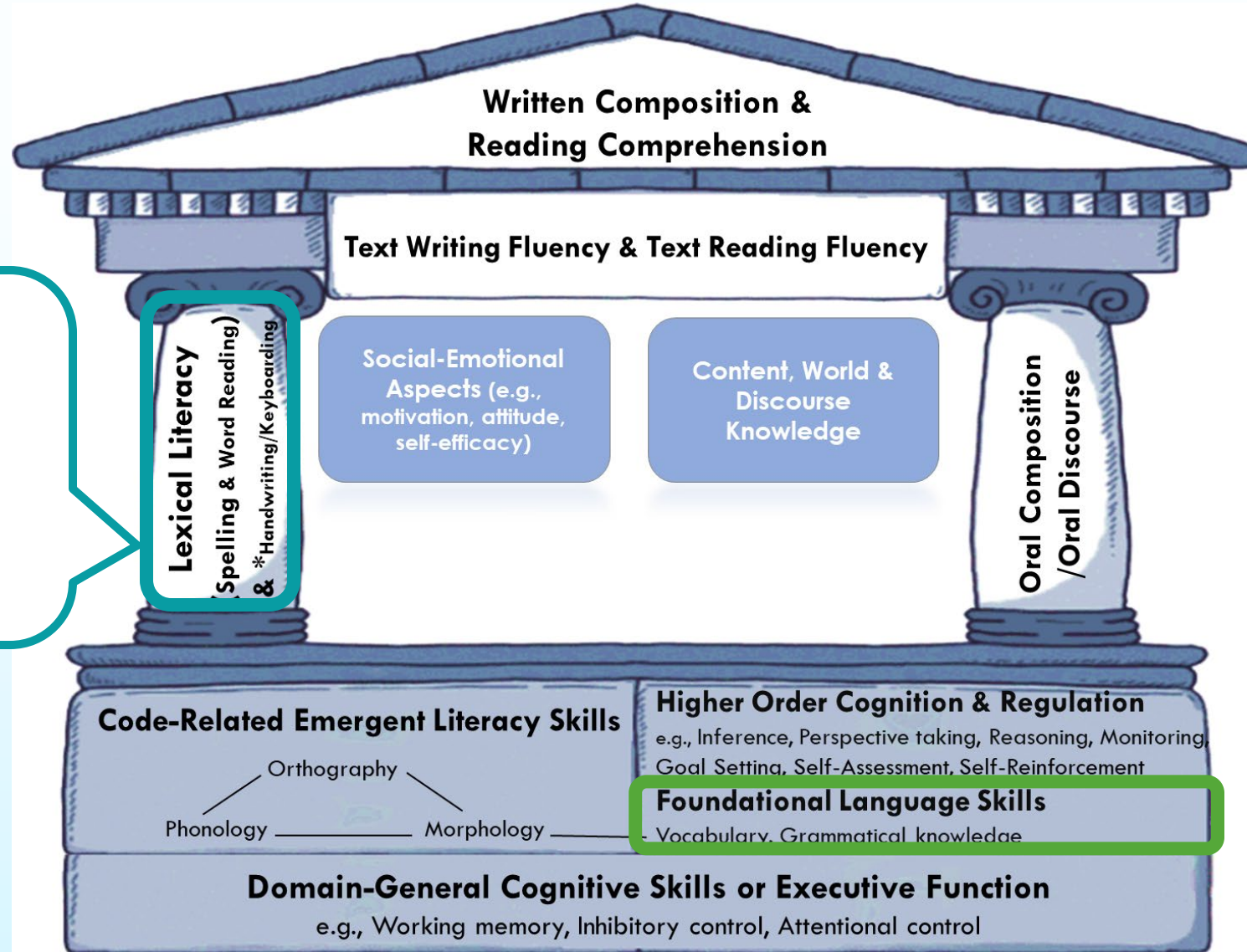
\*only relevant to written composition

Developmental  
Language  
Disorder

# Effective Writing Instruction: Learning Disabilities

## Dyslexia

Do not hold the development of higher order skills (use assistive technology) & intensive instruction



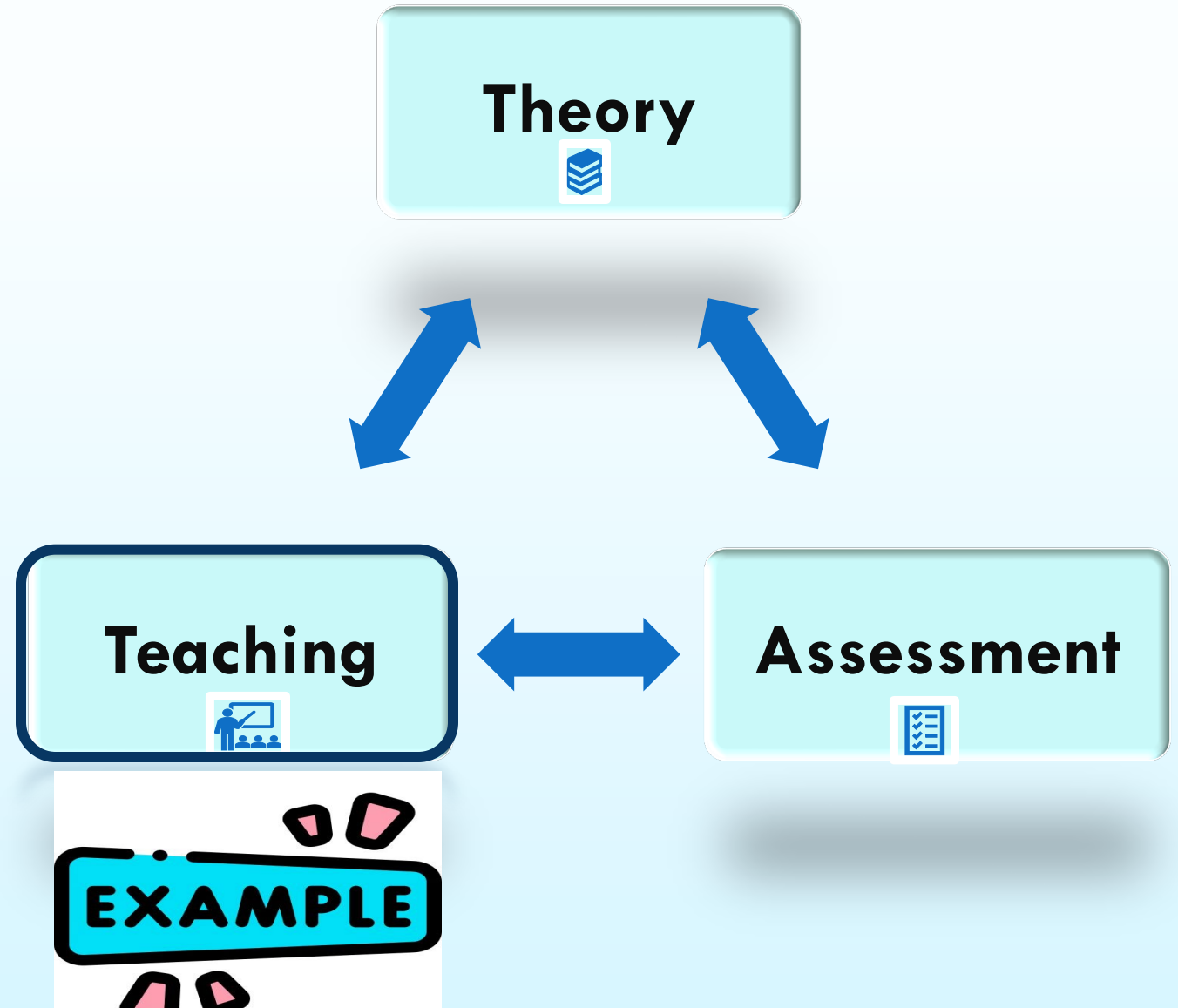
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Developmental Language Disorder

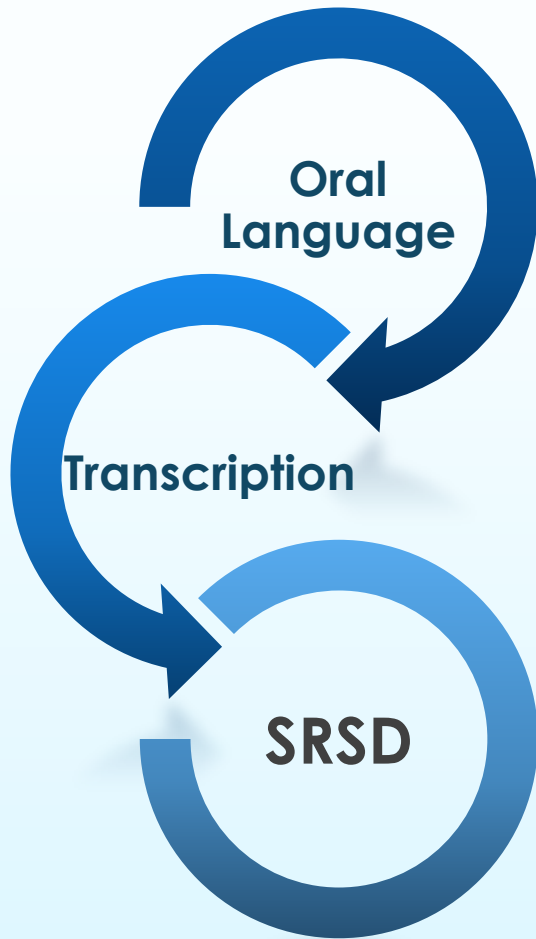


# Science of Writing

## Three Elements

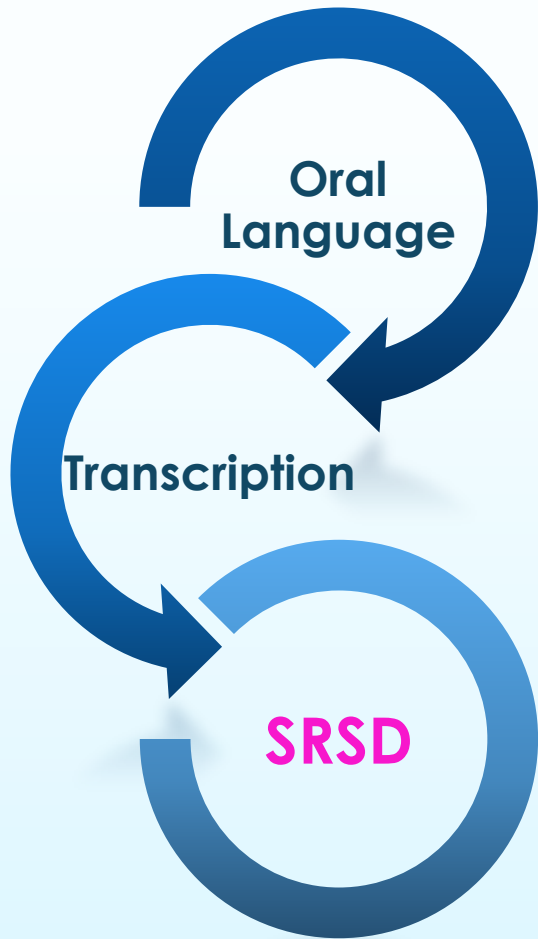


# SRSD+: Self-Regulated Strategy Development Plus



- Integrated reading and writing instruction
- Informational text writing (science) after text reading
- 50 minute instruction three times per week
- Grades 1 and 2

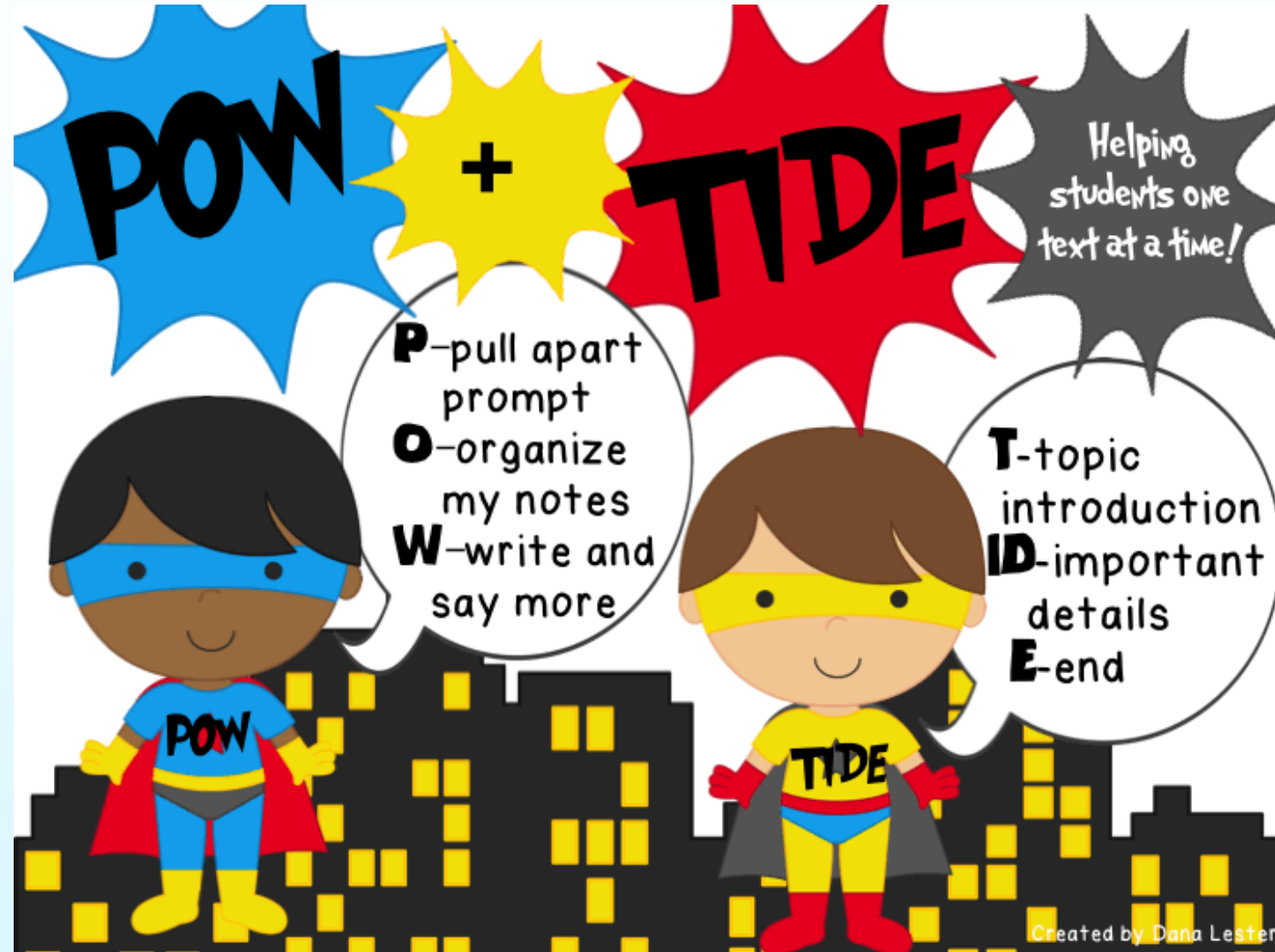
# SRSD+: Self-Regulated Strategy Development Plus



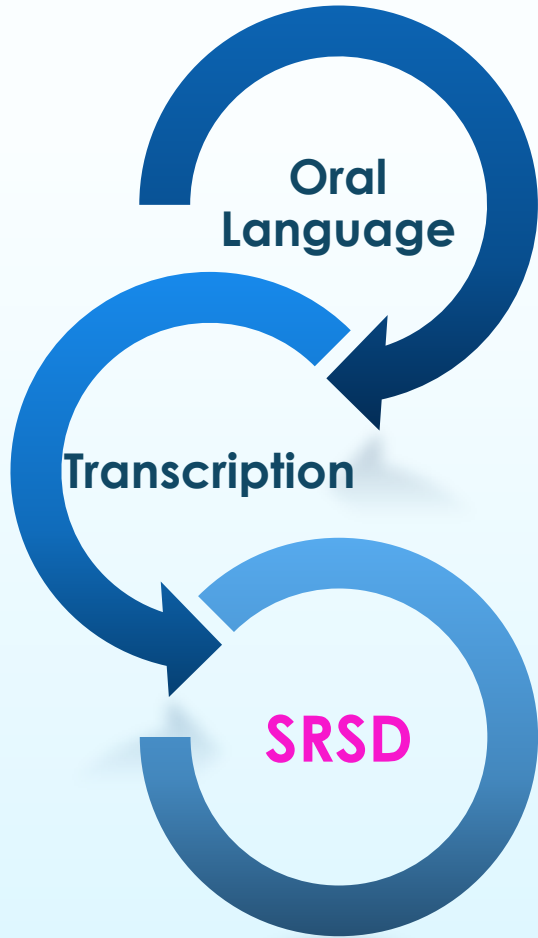
## Self-Regulated Strategy Development

includes differentiated, explicit, and scaffolded teaching of the writing process; discourse knowledge (e.g., text structure, considering audience); and genre-general and genre-specific strategies to regulate reading and writing processes (setting goals, self-assessment, self-instruction, and self-reinforcement; e.g., Graham et al., 2012; Harris et al., 2006, 2008; Harris & McKeown, 2022)

# SRSD+: Self-Regulated Strategy Development Plus



# SRSD+: Self-Regulated Strategy Development Plus



**T** Topic Sentence – tell what you are writing about

---

---

**ID** big Ideas – 1, 2, or 3?

---

---

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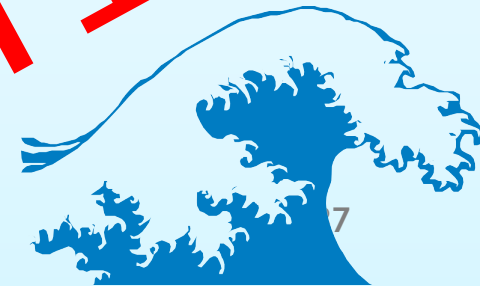
**E** Ending- wrap it up right!

---

---

## Grade 1

**TIDE**



# SRSD+: Self-Regulated Strategy Development Plus



**T** Topic Sentence – tell what you are writing about

---

---

**ID** big Ideas – 3 or more

---

---

---

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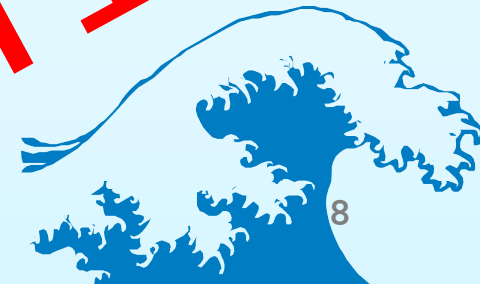
**E** Ending- wrap it up right!

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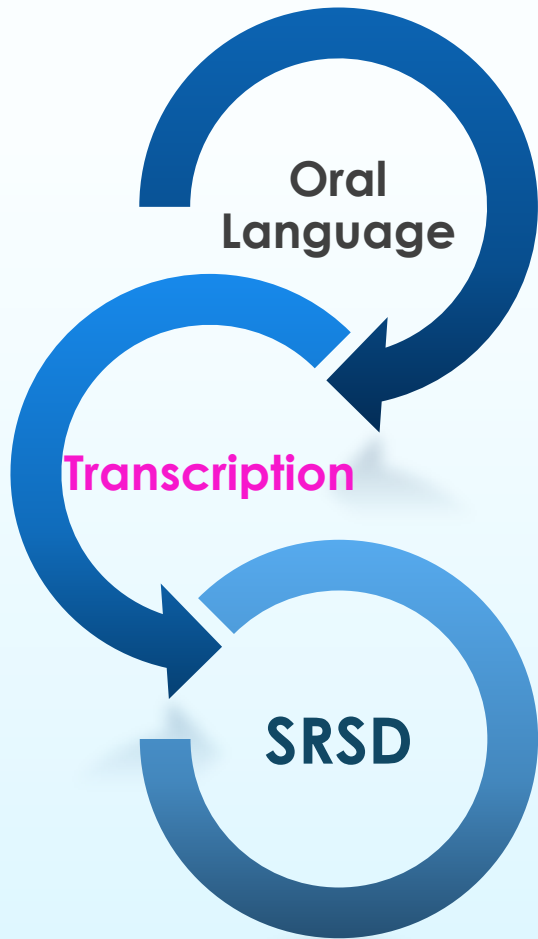
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## Grade 2

**TIDE**



# SRSD+: Self-Regulated Strategy Development Plus



## Spelling

- Attending to phonological, morphological, and orthographic aspects
- Developmentally appropriate patterns (e.g., CVC-, CCVC-, and CVCC-types)
- **Word study** (Apel et al., 2012; Bear et al., 2008; Graham et al., 1993)

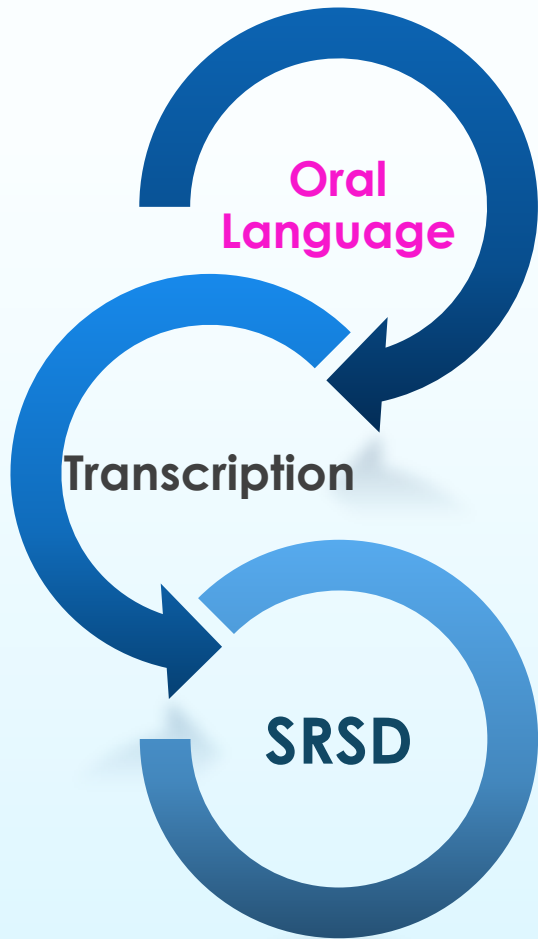
## Handwriting fluency

- Writing letters and words from memory (Berninger et al., 1997; Wanzek et al., 2017)

-oil	-oy	-ay	where
soil	joy	gray	where
boil	soy	spray	
coil	enjoy	stay	
foil	annoy	tray	



# SRSD+: Self-Regulated Strategy Development Plus



## Vocabulary

- Procedural words (informational, provide)
- Content words (photosynthesis)

## Sentence Proficiency

- Sentence combining

The man ate the pizza. He ate the pizza quickly.

→ The man ate the pizza quickly

- Sentence completion

Abby likes her mother to read her a \_\_\_\_\_[book]

The dog hit the \_\_\_\_\_ man (Strong, 1986; Saddler & Graham, 2005)

# Using adjectives

We use **adjectives** to describe a person, place, or thing.

Plants need three essential things to grow and survive.



# Temperatures



“The **icy cold** drink and the **steamy hot** coffee.”

# Sizes

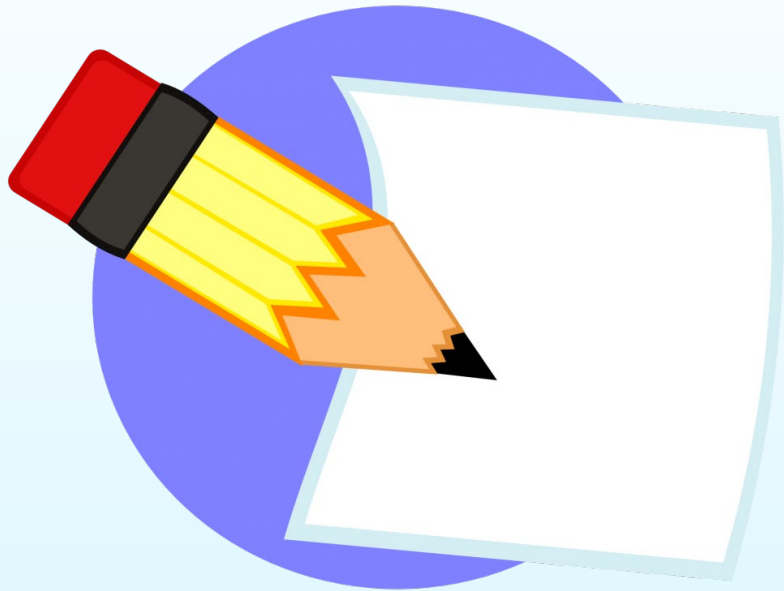


# Feelings



Here is a **calm** man and an **excited** child.

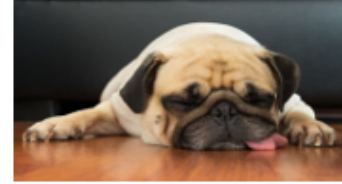
# Do it Together



## Grade 1 Unit 3: What do plants need for survival? Sentence Proficiency | Worksheet C

### Sentence Combination

Use the sentences to combine the two ideas about the dog.



The dog is tired.

The dog is sleeping.

---

Combine the two ideas by using an adjective.

1. I watched a movie. The movie was silly.

---

2. The boy reads a book. He is quiet.

---

3. That's their boat. It is big.

---

The dog is tired.

The dog is sleeping.

The tired dog is  
sleeping.



I watched a movie.

The movie was silly.

**I watched a silly movie.**



# Grade 1 Sample: Student A, planning and writing before

2017-2018 | SRSD+

Grade 1 Student Response Form

Pre-Test

ID LABEL  
110106 B

## Task 1: Writing B Animal Tails

**Essay prompt:**

Explain why animals have tails.

**Planning:**

2017-2018 | SRSD+

Grade 1 Student Response Form

Pre-Test

ID LABEL  
110106 B

## Task 1: Writing B Animal Tails

**Essay prompt:**

Explain why animals have tails.

**Your essay:**

all animals have  
tails.

Some animals live in the  
wild.

All animals have tails. Some  
animals live in the wild.



# Grade 1 Sample: Student A, after SRSD+ instruction

2017-2018

SRSD+  
Testing Session 1

Grade 1 Post-Test

## Task 1: Writing A Hair

110106

### Essay prompt:

Explain why hair is important to our bodies.

### Planning:

T do you know how hair can prote  
First 1. it can keep you from geting a  
Next 2. don't pool out your hair  
third 3. hair keeps you warm  
Last 4. hair can chang color too  
E Look in the mirror

**T** do you know how hair can protect  
**First** 1. It can keep you from getting a  
**Next** 2. don't pull out your hair  
**Third** 3. Hair keeps you warm  
**Last** 4. Hair can change color too.  
**E** Look in the mirror

The student is planning using the TIDE acronym (**T** & **E**) and using transition words.

## Grade 1 Sample: Student A, after SRSD+ instruction

### Essay prompt:

Explain why hair is important to our bodies.

### Your essay:

Do you know how hair can  
protect you? First, it can  
keep you from getting a sunburn.  
Next, don't pull out your hair.  
Third, hair keep you warm.  
Last, hair can chang color too.  
So go and look in the mirror  
and see your hair!

Do you know how hair can protect you? First, it can keep you from getting a sunburn. Next, don't pull out your hair. Third, hair keeps you warm. Last, hair can change color too. So, go and look in the mirror and see your hair!

The student successfully used the information in the planning sheet for composition.

# Grade 2 Sample: Student B planning and writing, before SRSD+ instruction

2017-2018 | SRSD+

Grade 2 Student Response Form

Pre-Test

## Task 1: Writing A Birds

### Task 1: Writing A Birds

**Essay prompt:** Explain why birds fly.

**Planning:** Birds fly because they can

Birds fly because they can

**Essay prompt:** Explain why birds fly.

**Planning:** birds fly becouse so ~~that~~ they  
can serviv ~~and~~ get food.  
and

Birds fly because so they can  
survive and get food.

# Grade 2 Sample: Student B planning, after SRSD+ instruction

## Essay prompt:

Explain the different sounds cats make to communicate with others.

## Planning:

T Cats are very popular  
h They have a very cool language.  
first of all the normal sound is a meow.  
The second sound is a purr.  
A third sound is a chatter.  
A final sound is a hiss.  
E If you ever play with a cat listen to its sounds.

TASK 1: Writing B (2/4)

**T** Cats are very popular

**h** (hook) They have a very cool language.

**Big ideas**

**first** of all the normal sound is a meow.

The **second** sound is a purr.

A **third** sound is a chatter.

A **final** is a hiss

**E** If you ever play with a cat listen to its sounds.

## Grade 2 Sample: Student B writing, after SRSD+ instruction

### Essay prompt:

Explain the different sounds cats make to communicate with others.

### Your essay:

Cat's are very popular. They have a very cool language. The first sound is a meow. They meow when they are hungry or need care. The second sound is a purr. They purr when you pet them or when they are happy. A third sound is a chatter. They are excited or hungry. If you ever play with a cat listen to its sounds.

Cat's are very popular. They have a very cool language. The first sound is a meow. They meow when they are hungry or need care. The special sound is a purr they purr when you pet them or when they are hungry. a third sound is a chatter they are excited or hungry. If you play with a cat listen to it's sounds.

# SRSD+: Self-Regulated Strategy Development Plus

## Sample Materials

- Kim, Y.-S. G., & Zagata, E. (2024). Enhancing reading and writing skills through systematically integrated instruction. *The Reading Teacher*, 77(6), 787-799.  
<https://doi.org/10.1002/trtr.2307>
- Click on the **supplemental materials link** at the end of the article for student samples & sample instructional materials
- Kim, Y.-S. G., Harris, K., Goldstone, R., Camping, A., & Graham, S. (2025). The science of teaching reading is incomplete without the science of writing: A randomized control trial of integrated teaching of reading and writing. *Scientific Studies of Reading*.  
<http://dx.doi.org/10.1080/10888438.2024.2380272>
- Harris+, K., Kim, Y.-S. G+., Yim, S., Camping, A., & Graham, S. (2023). Yes, they can: Developing transcription skills and oral language in tandem with SRSD instruction on close reading of science text to write informative essays at Grades 1 and 2. *Contemporary Educational Psychology*, 73, 102150.  
<https://doi.org/10.1016/j.cedpsych.2023.102150>

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# Selected References

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Berninger, V. W., & Winn, W. D. (2006). Implications of advancements in brain research and technology for writing development, writing instruction, and educational evolution. In C. MacArthur, S. Graham & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 96–114). New York, NY: Guilford.

Graham, S. (2018). A revised writer(s)-within-community model of writing. *Educational Psychologist*, 53 (4), 258-279. <https://doi.org/10.1080/00461520.2018.1481406>

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