

Written Communication Instruction in STEM Classrooms

Session will begin soon!

Please introduce yourself on pg 2 of this jamboard in the chat:
https://jamboard.google.com/d/19jul_jYFwsnxYnMZ0F7ddCRZwP8VDdQUQSgwVctmeEs/viewer?f=0

<https://cvent.me/2wRLgq>

UTSA[®]

The University of Texas at San Antonio[™]

10:00am Central February 9, 2023

TXSTEM Conference

Kathy.Ewoldt@utsa.edu

Suzanne.Byrne@utsa.edu

Who's here?

https://jamboard.google.com/d/19jul_jYFwsnxYnMZ0F7dd_CRZwP8VDdQUQSgwVctmeEs/viewer?f=0



Goals:

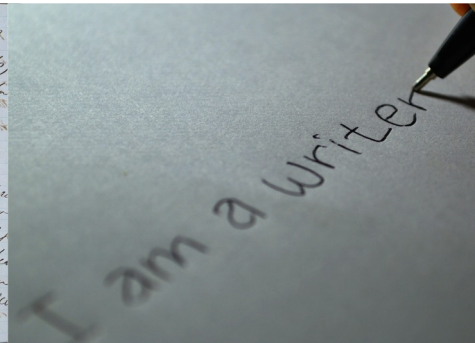
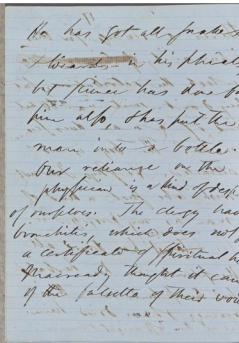
Increase teacher comfort with teaching paragraph writing in STEM classrooms

Improve student's capability to express STEM understanding in written expression

Objectives:

Why is writing instruction important in STEM Classrooms?

How can paragraph writing be taught using Reverse Engineering?



Why is Writing Instruction Important?

Assessment tool for content knowledge (Connelley & Dockrell, 2016;

Lower course grades & Graduation rates (Bangert-Drowns et al., 2004; Langer & Applebee, 2011)

“Gatekeeper” skill for equity; Most salaried jobs assess/require writing competency (College Board, 2004)

Why is Writing Instruction Important?

Voice,

Power,

Social media (need to be coherent to participate)

Why is Writing Instruction Important?

As early as Kindergarten in NGSS & TEKS

**Science & Engineering Practices: Obtaining, Evaluating,
and Communicating Information**

Search “Writ” yields 98 hits; TEKS = 28

**YET 65.9% of secondary teachers report “None” or
“Minimal” pre-service preparation to teach written
expression skills** (Gilbert & Graham, 2010)

Prompt: The third week in October is school lunch week. If you could create the perfect school lunch, what would it be? Write a paragraph that describes your perfect lunch. (3.3)



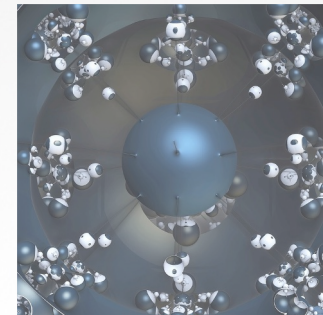
- “My perfect lunch would be pizza from Mystic Pizza, with Jello and fresh-baked cookies.”
 - “My perfect lunch would be thin, soft crust, pepperoni pizza. Right from the oven.”
-
- “My perfect school lunch is like this. In my perfect school lunch, we’ll have duck. Duck is super tasty. Another reason duck would be in my perfect lunch is because it is juicy. Another thing in my perfect school lunch would be green beans. Green beans would be in my lunch because they are super good to eat, tasty. Also, chocolate mousse would be in my perfect school lunch is because it is so light it melts in your mouth. It tastes like heaven. And that is my favorite lunch for school lunch week.”

Reverse engineering is the process of analyzing a subject system to (i) identify the system's components and their interrelationships and (ii) create representations of the system in another form or a higher level of abstraction” (Rekoff, 1985). Different from backward chaining and ‘beginning with the end in mind’.

Detective-like: How and why?



Requires deep understanding.



Typical writing
process

Graphic
Organizer

Draft

Reverse
Engineered

Sentence Types
&
Characteristics

Analyzed Draft

Backed into
Graphic
Organizer

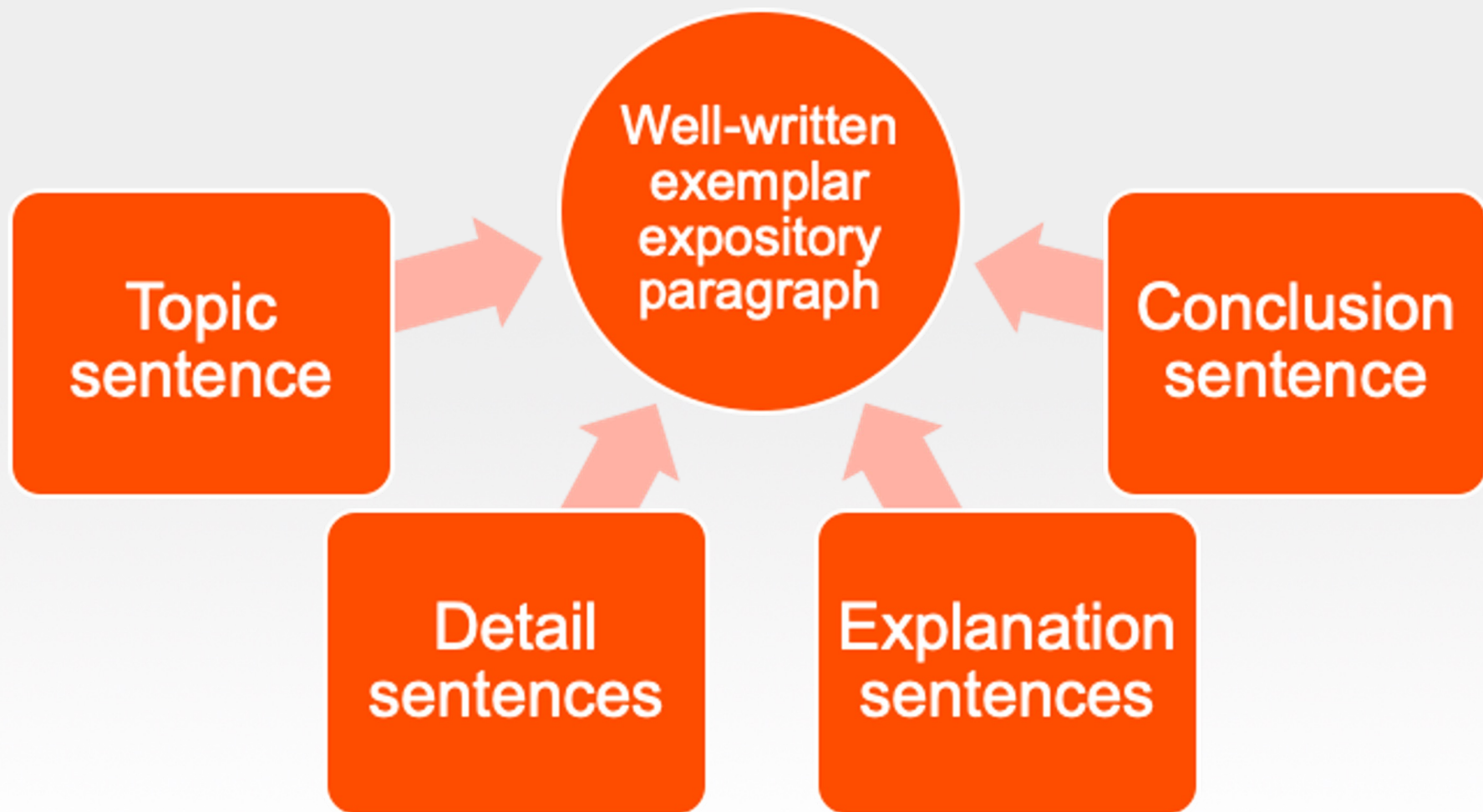
Highlighting function of each sentence

Cued similar locations across graphic organizer & exemplar paragraph

Cueing has a greater effectiveness for students with LD than typical peers (Swanson et al., 2010)

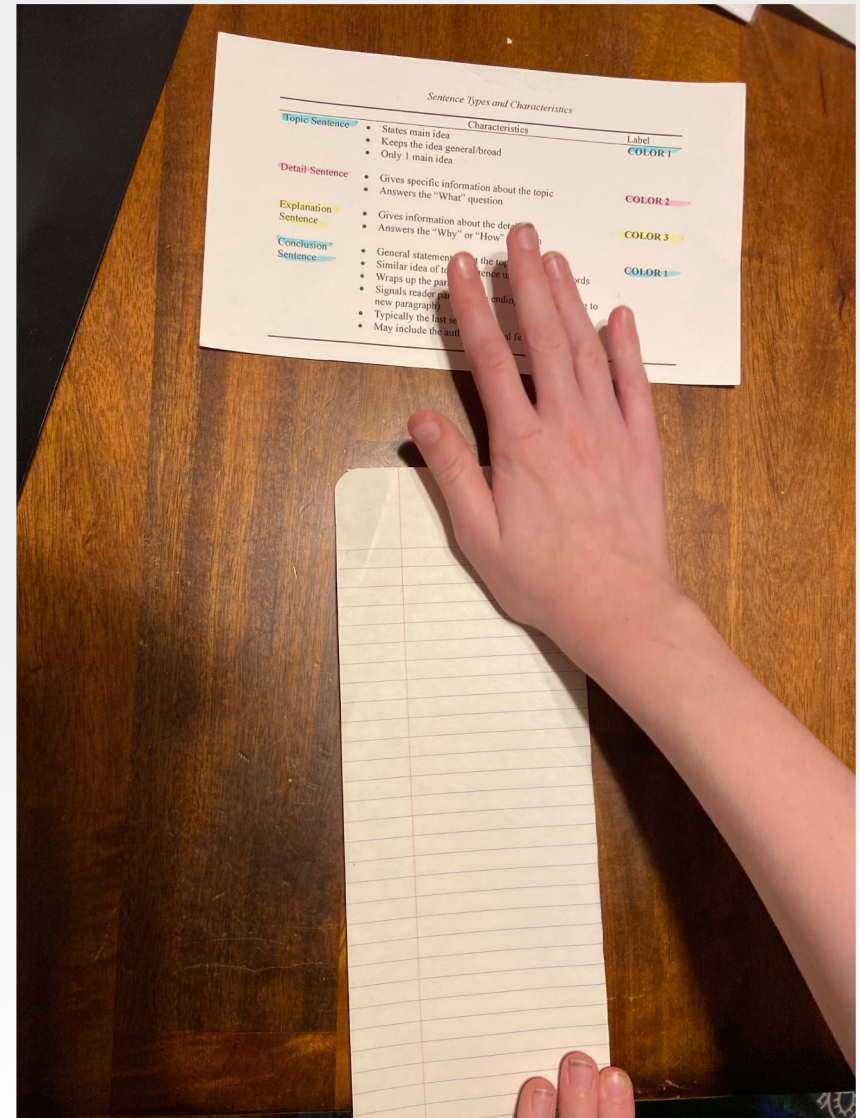
Color cuing assists with spatial reasoning and differentiation (Joh & Spivey, 2012)

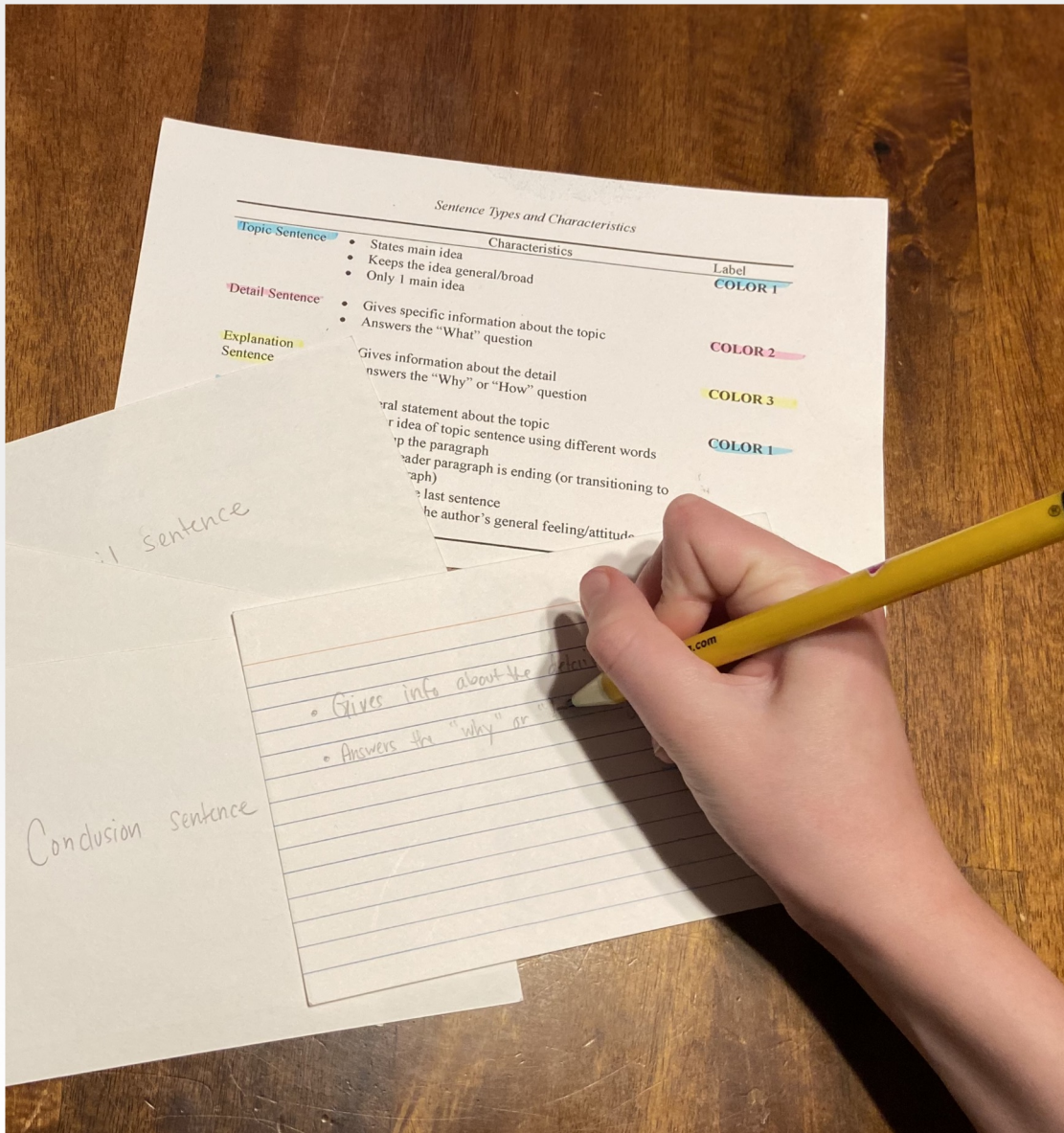
Reverse Engineering a Paragraph



Step 1: Notes to learn the sentence types and functions.

(Identifying the components and functions)

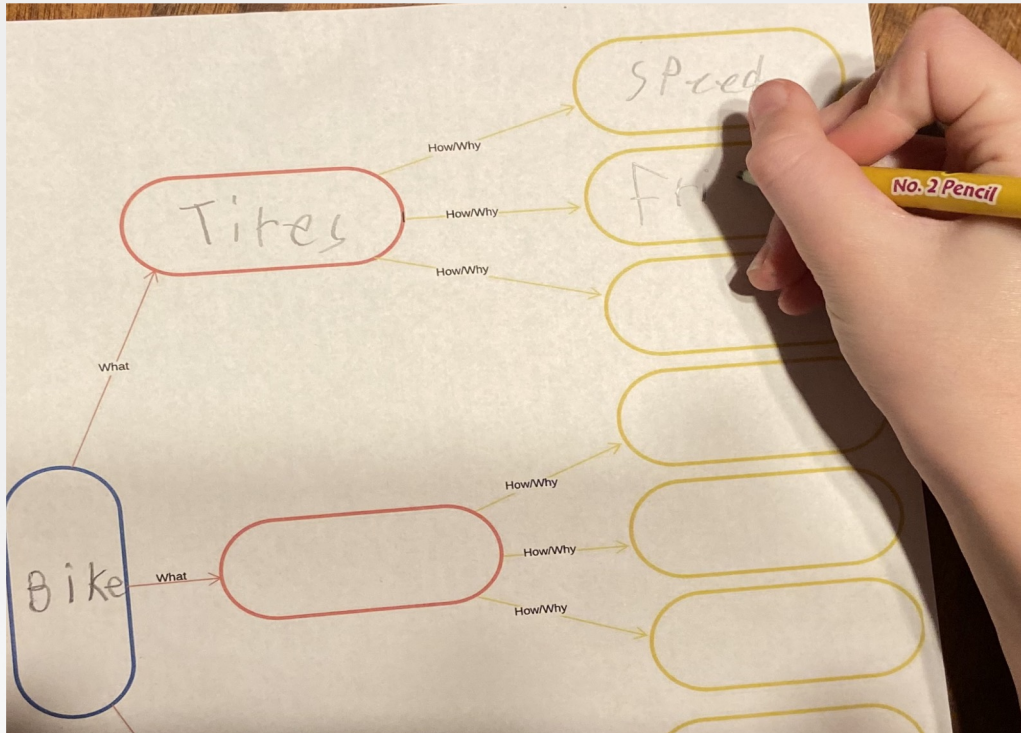




Step 2: Flashcards to practice the sentence types and characteristics.

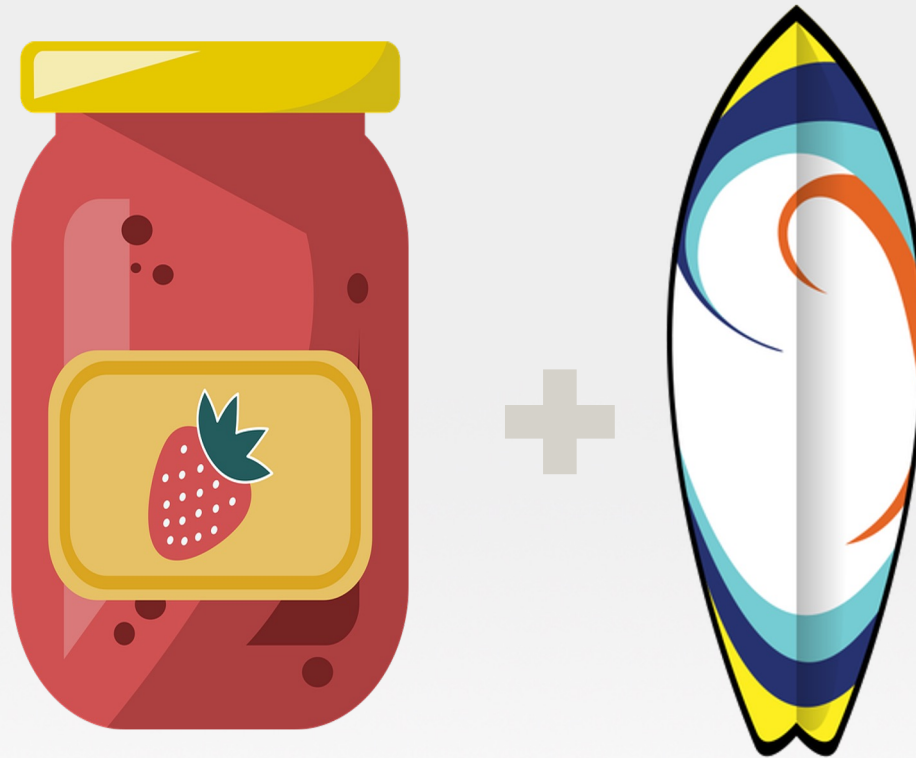
(Practice & fluency)

<i>Sentence Types and Characteristics</i>		
	Characteristics	Label
Topic Sentence	<ul style="list-style-type: none"> · States main idea · Keeps the idea general/broad · Only 1 main idea 	Blue
Detail Sentence	<ul style="list-style-type: none"> · Gives specific information about the topic · Answers the “What” question 	Pink
Explanation Sentence	<ul style="list-style-type: none"> · Gives information about the detail · Answers the “Why” or “How” question 	Yellow
Conclusion Sentence	<ul style="list-style-type: none"> · General statement about the topic · Similar idea of topic sentence using different words · Wraps up the paragraph · Signals reader paragraph is ending (or transitioning to new paragraph) · Typically the last sentence · May include the author’s general feeling/attitude 	Blue



Step 4: Create a graphic organizer from the model paragraph.

Creating a "representation of the system".



Groupwork - Part 1

1. Use the Jamboard slide that has your breakout room number at the top.
2. Discuss each sentence with those in your group and decide which type of sentence it is. (Consult the sentence types and characteristics chart on Jamboard-slide 4.)
3. Highlight each sentence according to the type you decided.
4. Questions? Don't worry! Dr. Ewoldt will pop in to see how its going.

How did it go?

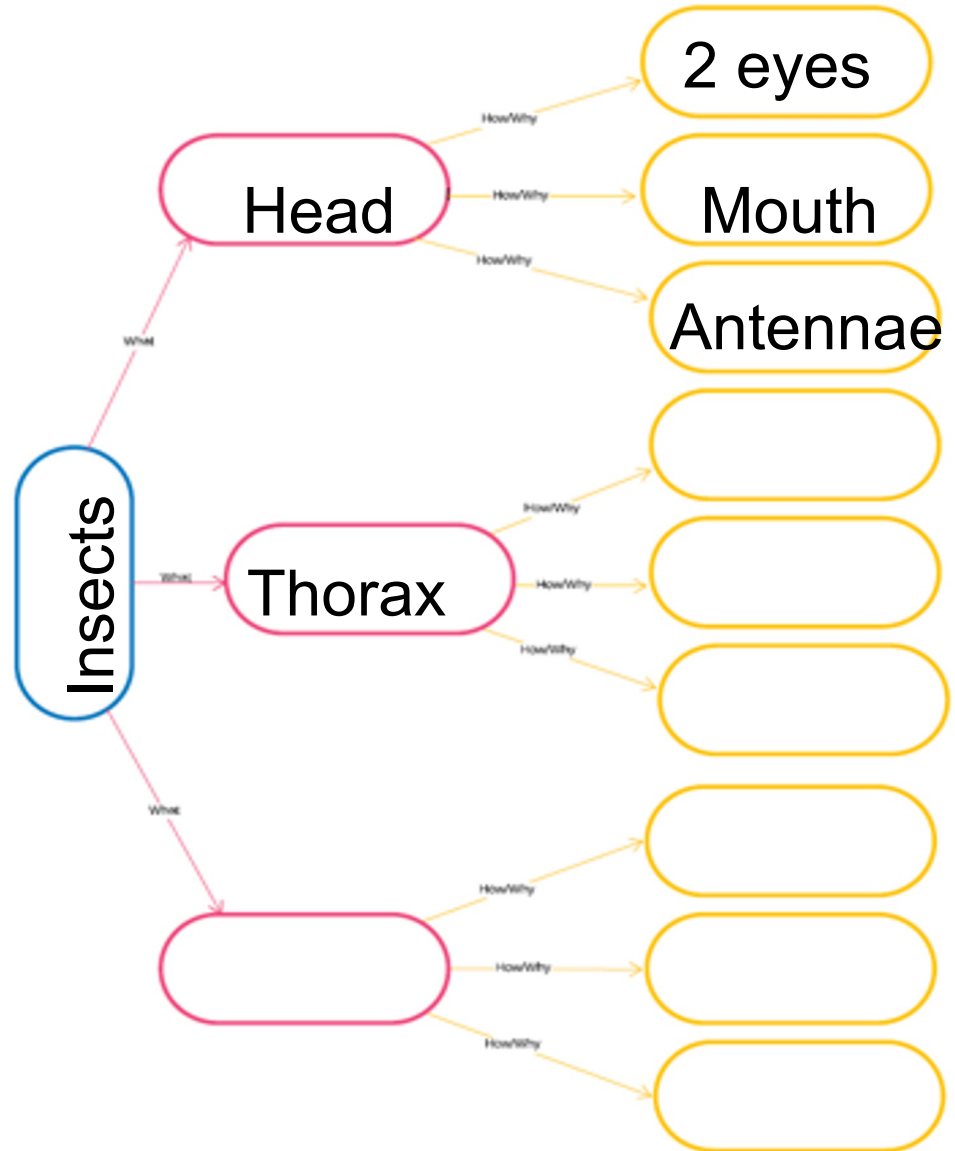
Groupwork - Part 2

1. Find the Jamboard slide that has a graphic organizer with your breakout room number at the top.
2. Have one member in your group go to the slide with your highlighted paragraph.
3. Read each sentence and choose 1-2 words that capture the keywords in the sentence.
4. Write the keywords onto the graphic organizer in the corresponding bubbles. The colors should correspond to your highlighting.
5. Questions? Don't worry! Dr. Ewoldt will pop in to see how its going.

For a bug to be an insect, it has to have three body parts. The head is the first part. It has two eyes. The mouth is part of the head. The two antennae are there also. The thorax is the middle of the insect. It has three pairs of legs. The abdomen. When an insect has wings, they are attached to part. It is the largest part of the insect's body. It is where to be an insect, it takes all three of these body parts.

STEPS:

1. Read the sentence.
2. Decide on 1-2 word main idea.
3. Write the main idea into the graphic organizer.



Questions?

Please share your thoughts with a post it! Do you think you could use this intervention in your class? Why or why not?



Ewoldt, K. B., & Morgan, J. J. (2017). Color-coded graphic organizers for teaching writing to students with learning disabilities. *Teaching Exceptional Children*, 49(3), 175-184. <https://eric.ed.gov/?id=EJ1140173>

kathy.ewoldt@utsa.edu
suzanne.byrne@utsa.edu

Breakout room 1

Use your highlighted paragraph and the steps below to build the graphic organizer the author of your paragraph might have created.

STEPS:

1. *Read the sentence.*
2. *Decide on 1-2 keywords*
3. *Write the keywords into the graphic organizer.*

