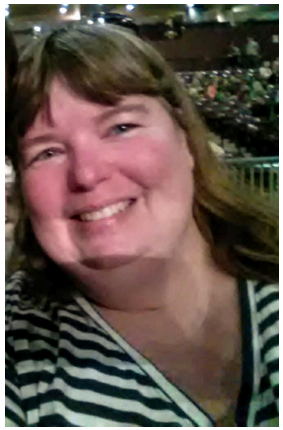
LINKING SCIENCE, MATH & LITERACY

Vaping: Not For The Young at Heart	
Sheila Buus 	My name is Sheila Buus. I have been teaching for 23 years at various rural schools in Southwest Missouri. I am currently teaching at Dadeville R-II Schools, where I have worked for the last six years. I currently teach K-5 Music, 6th grade Science, 7th/8th grade STEM, 9th ELA, and Forensic Science. It's quite the mix of classes, but makes every day interesting and special! I am the mom of a special needs warrior and have worked closely with the special needs populations in my districts. I chose to implement the Vaping unit because it is a very germane topic for my students right now. Middle schoolers are a unique mix of "I know everything" and "But WHY?" that allows for some deep dives into topics that are relevant to them. This unit helps to capture that interest and allow them to inspect, discover, and reason their way to a deeper understanding of the dangers associated with tobacco and vaping use. I implemented this unit with my 8th grade STEM class. I have had this class since 6th grade when they were in my Science class. STEM is a semester long class at our school. This year's 8th grade class has 12 students. While this year's group does not include any IEP students, I have included multiple scaffolds and supports to help those students who do have various levels of ability. There are many activities that allow students to move about the room to help my students with ADHD, group reading to assist low readers, and multiple hands-on activities to allow for authentic experiences instead of just sitting and reading about a topic. Classroom discourse features prominently in every lesson because it allows for even those students with poor writing skills to become empowered to participate and have their thoughts included in the overarching discussion. **Vocabulary List:** cardiovascular system, nicotine, homeostasis, sympathetic nerves, parasympathetic nerves, electrocardiography, randomized, addiction, neurotoxin

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Text Set Overview

ANCHOR TEXT		
Vaping: Not For The Young at Heart		
TEXT SET LINE OF INQUIRY		
SCIENCE	**MATH**	**LITERACY**
Determine cause and effect relationships between body system functions and the use of tobacco products	Investigate patterns of association in bivariate data	Construct a persuasive argument using evidence and reasoning

Lesson	Outcome(s)	Connections to Standards (CCSS, NGSS)
1	Analyze how marketing influences decision making and behavior	ELA 6-8.RIT.2.D: Analyze Craft and Structure (Argument/Evidence) ELA 6-8.SL.1.A-C : Collaborating
2	Describe how nicotine affects body systems	MLS 6-8.LS1.A.4 From Molecules to Organisms: Structure and Process ELA 6-8 RI.1.A-D Comprehend and Interpret Texts ELA 6-8 RI.3.A-D Synthesize Ideas from Multiple Texts ELA 8.SL.1.C Comprehension and Collaboration
3	Determine how the ultimate cost of vaping is detrimental and create a strong message to convey that fact	ELA 6-8.RIT.3.A-D: Synthesize Ideas from Multiple Texts ELA 6-8 SL.2.A-C: Presenting/Speaking MATH 8.DSP.A: Investigate Patterns in Bivariate Data

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Unit Lesson #1

Guiding Question	**How do advertisers use marketing strategies to target specific audiences?**	
	Key Idea(s)	**Learning Activities**
Engage	What kinds of advertising is directed towards teens/pre-teens?	Play "Shut Up and Dance" as the students enter the classroom. Students will join in and begin dancing along with the song. **Class Discussion (Can also be written on board for journal questions)** ● *What was it about this song that made you join in and dance?* (Answers will vary, but include: beat, the melody, because it says to dance, etc.) **Small Groups (Discuss/write the answers to the following questions)** ● *What age group does this song want to influence?* ● *Are there advertisements that are specifically made for your age group?* ● *How do advertisers target teens in their advertisements?* ● *What makes teens want to purchase an advertised item? What things turn them off of purchasing an item?* ● *Do companies promoting an unhealthy item tell the complete truth in their advertising? What kinds of things do they do to inform the public about the risks/side effects of their item?* ● *What kinds of strategies do companies use to sell their product and how do they use those strategies?* **Whole Class Discussion** ● After allowing for small group discussion time, return to whole class discussion and create a mind map on board with the results of the student ideas

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Explore	Are there different types of advertisements or persuasion?	Show slides 1-4: Copy of YOU REALLY NEED THIS STUFF! Students could work in groups and discuss, they could use dry erase markers on table tops, or complete as a written assignment.
Explain	Identifying rhetorical appeals and advertising techniques. What is a target audience?	Show slides 5-26: Copy of YOU REALLY NEED THIS STUFF! ● Topics: ○ Rhetorical appeal ○ Five most common advertising appeals ○ Target audience for a product ● Activities: ○ Have students fill out: Copy of Advertising 101 ○ Sing multiple common jingles (Kit Kat Song, O'Reilly's, McDonalds, etc.). Students added in several of their own examples--we had fun with it!
Elaborate	How did JUUL target underage consumers?	Show slides 27-28: Copy of YOU REALLY NEED THIS STUFF! ● Topic: ○ JUUL ad lawsuit videos ● Activity: ○ CER: *Did JUUL willfully target underage consumers?* I allowed students to work in groups of 2-3 to complete this CER. This allowed my students who struggle with writing to contribute but not have to struggle with putting their words on paper.
Evaluate	Analyzing types of ads to demonstrate understanding of target audience and techniques.	Show slides 29-34: Copy of YOU REALLY NEED THIS STUFF! ● Activity: Have students complete this worksheet.

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Unit Lesson #2

Guiding Question	**How do environmental factors affect the body's ability to maintain homeostasis?**	
	Key Idea	**Learning Activities**
Engage	There are multiple factors that can affect homeostasis.	**Class Discussion** ● *What are some things in our environment that can affect our body's ability to maintain homeostasis? Which things are natural (from nature)? Which things are caused by human actions? Are there any that are both?* ● Students may come up with ideas like pollen, pollution, climate change, or disease. Select a few students to share their thoughts with the class. Sometimes you need to ask questions to get them to think a little deeper about their ideas. For example, I had a student say that pollution was caused by human actions. I asked them (and the rest of the class) if there was any time that pollution had natural causes. They decided that volcanoes can cause air pollution and they are natural. ● I had students write on magnetic "post-it" notes and then put them on the board in a Venn Diagram. Then they discussed and moved their responses to a different location as they discussed whether or not it could be amended or changed.
Explore	Homeostasis can be affected by both human and environmental factors. How these factors affect various human body systems.	**How Environmental Factors Influence Body Systems** ● The purpose of this activity is to provide content and build understanding of how environmental factors can affect body systems. Later, when they learn about how vaping affects your body, they will be able to understand how and why that is possible. We also want them to see that they have control over some things that affect their body. ● Post the following information on the board: *Your group will be assigned a topic. Skim through your assigned texts. Write your group answers to these questions on your white board.* ➢ *Which body systems are affected?* ➢ *How does it affect those systems?* ➢ *Is it natural, human-made, or both?*

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		• Assign a topic to each group and provide them with whiteboards and markers. They have 8-10 minutes to scan their article and answer the three questions on their whiteboards. They need to be prepared to share their answers with the class as well as answer a few simple questions. Be prepared to walk around and help them go deeper in their answers and understanding. For example, some kids did not discuss all the systems affected OR they decided something only had natural causes when it also has human causes.
		  ○ *How does pollen affect body systems?*
		  ■ Article
		  ■ Article
		  ○ *How does air pollution affect body systems?*
		  ■ Article
		  ○ *What diseases affect your body systems?*
		  ■ Article
		  ■ Article
		  ○ *How does a poor diet affect your body systems?*
		  ■ Article
		  ■ Article
		• As groups share, ask questions to clarify their answers and encourage other people to add their thoughts. I asked questions like, "*Is there ever a time when that environmental factor is natural/human caused?*" and "*Can anyone think of any other systems that might be affected by that*?"

Explain	How heart rates are affected by activity levels. How lung capacity is affected by impediments to breathing.	**Heart Rate Lab- Resting vs. Active Rate** Copy of We've Got The Beat • In a perfect world, I would have had each activity repeated multiple times to create an average for each heart rate. In order to accommodate our time, the students averaged their different activity rates as one unit. The point was made that these activities will raise your heart rate. **Lung Capacity Lab---Balloon Activity (Normal vs. Hindered Breathing)** (*Note*: The material I used for the lab was a t-shirt that had been cut into 4-inch squares.) Copy of Got Air? (Lung Capacity Lab)

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	Reading and annotating informational texts.	• We then discussed various activities/behaviors that allow heart rates to change. Natural vs. chemical changes (e.g., exercise vs. caffeine). Students worked with a partner to discuss/question whether heart rate changes are good or bad. We then moved on to things that cause hindered breathing (e.g., asthma/allergies vs. chemicals). **Table Talk** • This activity allowed the text to do the explaining. Students were split into groups based on the number of texts. Each group read through their assigned text and then took a dry erase marker and wrote their biggest takeaway onto the table top. I had the groups rotate every 10 minutes so that every group read every article and commented on them. We finished class by engaging in a whole group discussion of their biggest takeaways. • Texts: ○ Copy of Vaping may stiffen the heart and blood vessels.pdf ○ The Scary Truth About Vaping ○ The Health Impacts of E-Cigarettes **Anchor Text** • Building on the activity from the previous day, students were given the anchor text. We reviewed the parts of an informational text before students read the text. They highlighted the facts that stood out to them and then shared their insights with their shoulder partner.
Elaborate	How does nicotine affect the body?	**Planaria Lab** • We covered some basic facts about planaria and their anatomy before completing this lab. Students were allowed to complete the CER as a group. **Whole Class Discussion** • Students watched the first 7:45 of this video and noted what information stood out to them. After watching the video, students came to the board and wrote one big thought/question out. Each question/thought was discussed.

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Evaluate	Make a reasoned argument based in evidence to explain how vaping affects body systems.	**CER Exit Slip** Using the anchor text and other texts from this lesson, write a 2-5 sentence statement that supports the claims: "Vaping Negatively Affects the Body." Include evidence in your statement. Students had to use the anchor text and the other texts from this lesson as the basis for their evidence.

Unit Lesson #3

Guiding Questions	**What is the true cost of vaping?**	
	Key Ideas	**Learning Activities**
Engage	How does a vaping habit add up? What is the actual cost to a person who uses these products?	**What's It Gonna Cost You? Activity**: ● Students were given a "paycheck" and had to use their money to pay for real-world expenses. After paying for their necessities, they then figured up the cost of a vaping addiction and how that impacted their bottom line.
Explore	Evaluate data regarding cigarette and vaping products	**Vaping: The True Cost** ● Students were put into groups of 2-3 to complete this activity that compares the amount of cigarettes smoked to the amount of vapes used weekly. The graph on the first page presents two competing data streams in one graph and students evaluate how those data relate to each other.

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Explain	What other costs are there for people who smoke/vape, and how does this add to the true cost of this addiction?	**Articles** ● Today's nico-teen addicts: What role does 'juuling' play? ● Anchor Text **Activities** ● Students highlighted/annotated the most important parts of both texts to find areas that gave good evidence about the costs of vaping to a person's health. After reading both texts, students worked with their table group to list the five most important pieces of evidence to use in their final project. ● As a class, we discussed any questions/concerns that had been annotated in the texts. (e.g., *How much nicotine does it take to become addicted?, Do vapers/smokers get sick more than other people?, Why do vapes blow up?, What are other neurotoxins?, What's wrong with "safe" vapes--ones that supposedly contain zero nicotine and only flavors?*). ● These discussions led to answers being written in the margins of the articles as well as some deeper thinking about "sneaky" advertising tactics.
Elaborate	Synthesize information from multiple sources to outline a PSA	**Opening Activity**: ● We did call/response and a "Name that Tune" for popular advertising jingles that we hear every day. I included: O'Reilly Auto, McDonald's, KitKat, State Farm, AllState, Liberty Mutual, Pepto Bismol, and a few others. This served to remind students of the power of a good jingle as well as get them thinking creatively for their final project. ● Students were placed into differentiated ability groups and given the task of taking all of their assorted texts, handouts, experiments, and discussions and using that information to create a compelling public service announcement that will help teens make better choices regarding nicotine use. I gave them the choice of making a TV ad, a radio/podcast ad, or a poster. The TV or radio ads had to be at least 30 seconds and include a script They had to include the following in their PSA: ● Slogan/jingle ● At least 2 advertising strategies ● Information on health risks associated with vaping ● Information on the amount of nicotine in vaping pods/effect on the body ● Information on the cost of this habit and how it affects your quality of life

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Evaluate	Create a clear and convincing argument against nicotine use	**<u>Student Presentations</u>** ● Students presented their advertisements. ● After viewing their videos and posters, they wrote reflections about the unit and things they had learned throughout the unit. The entire class included the claim, evidence, and reasoning process in their writing. Many made connections between their reading and their hands-on activities and used the activities to more fully describe their thoughts and perceptions.

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