CATCH MY BREATH

Inhaling Flavor Digital Lesson Educator Guide

HIGH SCHOOL | SUPPLEMENTAL LESSON BUNDLE

Generously supported by
CVS Health FOUNDATION
BE VAPE FREE | Discovery EDUCATION

Background Info

Why is learning about flavored e-cigarettes important?

While most people today are informed about the risks of cigarette smoking, there continue to be many misconceptions about e-cigarettes and the dangers they pose to a person's health and well-being. Flavored e-cigarettes further increase this risk by not only tempting young users to try vaping, but by also masking the dangers of these products *and* adding to their overall harm.

Though various bans and regulations have tried to reduce the availability of flavored e-cigarettes, loopholes still exist. The use of e-cigarettes, especially by young people, remains a serious public health threat. In the 2021 National Youth Tobacco Survey, more than 2 million middle and high school students reported current e-cigarette use.[1] Almost 85% of teens who have ever used a tobacco product say they started with a flavored product.[2] Teens are not only more likely to try flavored e-cigarettes than unflavored e-cigarettes, but studies show they are also less likely to be aware of the harm of flavored e-cigarettes. Therefore, it is imperative that students learn more about e-cigarettes and the serious health risks associated with them in order to make educated decisions regarding their personal health.

How will my students learn about the dangers of e-cigarettes?

During these four sessions, students in grades 9-12 will investigate the science of taste and flavor, their correlation to vaping addiction, and the effects of e-cigarettes on the human body. Through a series of activities, students will:

- Explore the concept of addiction;
- Investigate the brain science behind taste and flavor;
- Learn how flavored e-cigarettes work;
- Understand how and why flavored e-cigarettes affect the human body;
- Create an ad campaign that educates their peers about the risks associated with vaping and the role of scents and flavor as appeal.

How do the sessions work?

Instructional sequence: The Educator Guide provides details to help educators facilitate a series of four 45-minute sessions designed to be taught in sequence to high school students. This guide was created to give educators ideas and strategies for presenting the content in the digital lesson. It provides slide-by-slide details to assist educators in engaging with students as they explain and facilitate discussion of the content in each of the sessions.

In addition to the Educator Guide, the sequence includes a presentation that can be used in a variety of classroom settings. If you are using a laptop with a projector, simply progress through the PowerPoint by clicking to advance. All of the interactive aspects of the presentation are set to occur on click. The corresponding videos link to the slides. Click on the images to play the videos. If you are using an interactive whiteboard, tap each slide with your finger or stylus to activate the interactive aspects of the presentation. It doesn't matter where you tap, but you can make it appear as if you are making certain things happen by tapping them. Each slide includes teacher notes with information on how to proceed.

[1] https://www.cdc.gov/mmwr/volumes/70/wr/mm7039a4.htm
[2] https://www.cdc.gov/mmwr/volumes/70/wr/mm7039a4.htm

Session Structure

Each session provides the following information to guide the teacher through its implementation and teach the necessary skills and content:

- **Learning Objectives:** Each session includes its overall goals as well as specific behavioral and cognitive objectives for students.
- **Materials:** Materials necessary for the session are clearly outlined and included when possible, to facilitate easy implementation.
- **Educator Prep:** Describes preparation of materials.
- **Key terms:** Words that can be used as vocabulary words are defined.
- **Key talking points:** Helps the teacher guide discussion and reinforce key concepts. Key points are listed next to the corresponding slides.
- **Potential student responses:** Sample student responses to activities and questions are provided next to corresponding slides.
- **Summary/wrap-up:** A summary or wrap-up is provided at the end of each instructional session to help reinforce the key concepts and objectives of each session.

Session 1: Engage and Learn

Learning Objectives

Students will be able to:

- **Define** "addiction."
- **Understand** how the industry uses flavors to attract young people to their products.
- **Analyze** the factors that contribute to flavor preferences.

Overview

The session will begin with a conversation starter activity in which students use the DSM-V addiction scale to consider whether different activities and substances could be considered addictive. Students will come to understand that addiction can apply to activities as well as substances. They will look at the basic brain science behind addiction, especially when related to nicotine, and they will consider who benefits from encouraging or enabling an addiction.

Students will then begin to explore the relationship among e-cigarettes, flavor, and addiction. Students will participate in a close reading that helps them understand that humans' preference for sweetness is a result of evolution. They will then apply this learning as they explore how e-cigarette companies have used this evolutionary preference to persuade the public to try vaping. They will ultimately be prompted to connect teen vaping addiction with decisions tobacco companies have made in regards to e-liquid flavors.

Materials

- **Session 1a Discussion Cards & Addiction Tracker**, enough for one-third of the class (cut out in advance)
- **Session 1b "Addicted Early" Video Discussion Questions,** teacher resource
- **Session 1c The Role of Taste handout**, one per students

Educator Prep

- Print out copies, one for every three students, of the **Session 1a Discussion Cards & Addiction Tracker** and cut out the cards in advance.
- Print out copies of the **Session 1c The Role of Taste handout** for each student

Key Terms

- **E-cigarette:** a battery-powered device that heats an e-liquid to make an aerosol that is inhaled. It may also be called an e-cigarette, vape, or Electronic Nicotine Delivery System (ENDS).
- **Disposable E-cigarette:** an e-cigarette device that cannot be re-used once the e-liquid has run out. Disposable e-cigarettes can have a dangerous dose of nicotine or other drugs.

- **Addiction**: a brain disease that rewires your brain to need a substance to feel okay. It can cause anxiety, depression, and future addiction to other substances.
- **Dopamine**: a neurotransmitter that helps us feel enjoyment, satisfaction, and pleasure.
- **Taste**: the sense by which the sensations of sweetness, sourness, bitterness, savoriness, and saltiness are detected through taste buds on the tongue.
- **Flavor**: a combination of taste and odor.
- **Nicotine**: A highly addictive drug found in tobacco leaves, cigars, cigarettes and nearly all e-liquids. Once someone is addicted to nicotine, it can be very difficult to stop using it.

Slide 1 | Title Slide

Slide 2 | Engage

- Open by distributing one set of **Session 1a Discussion Cards & Addiction Tracker** to student groups of three.
- Take a moment to review the addiction tracker. Explain that the American Psychiatric Association has a handbook called the Diagnostic and Statistical Manual of Mental Disorders (DSM) that is used by doctors around the world to diagnose mental disorders. After decades of research, doctors developed these eleven symptoms for diagnosing substance use disorders, which are disorders in which people use substances in unhealthy ways.
- Then encourage groups to follow the directions on the handout as they review the tracker and discuss the cards with their group members.

Slide 3 | Learn[3,4]

- Click once to display a fifth "nicotine" card on the slide.
- Ask students to use their Addiction Tracker to consider one more thing: Do you think using this substance could be addictive based on this same criteria? After giving students a moment to consider the question independently, invite them to share their responses.
- Then follow-up with: Would you guess that addiction to nicotine is the same as addiction to the other cards? Why or why not?
- Before giving an answer, click twice to display the definition of addiction and read it aloud.
- Explain that activities, drugs, and alcohol can *all* be addictive.
    - Some activities—such as eating, shopping, going online, or gambling—can become addictive because of brain science. These activities can create a chemical effect in the brain that is similar to the reaction it has to drugs.
    - When a person engages in an activity that they enjoy, their brain's reward center is activated, and the ventral tegmental area of the brain (VTA) releases dopamine. Dopamine is a neurotransmitter or a chemical that creates sensations of satisfaction and pleasure.

[3] https://www.ncbi.nlm.nih.gov/books/NBK507184/
[4] https://www.cdc.gov/tobacco/basic_information/e-cigarettes/about-e-cigarettes.html

    - The brain likes to feel this way, and it notes what is happening. The brain, especially the nucleus accumbens (also known as the brain's reward system), then motivates the person to do more and more of the activity in order to feel more and more pleasure.

- Stress that addiction to nicotine is different than an addiction to food, caffeine, social media, and shopping. Explain:
    - If someone becomes addicted to nicotine, they become physically addicted to the drug.
    - Each time they take a puff of a cigarette or e-cigarette, the brain's reward center releases dopamine. This dopamine affects the brain's prefrontal cortex (which controls decision-making) and teaches the brain to repeat the behavior again and again.
    - The person feels like they must take part in the activity more and more frequently not only to experience pleasure, but also to avoid feeling bad. This occurs because the brain rewires itself and actually needs nicotine in order to feel okay.
    - This rewiring can cause anxiety, depression, and future addiction to other substances. It can also cause strong withdrawal symptoms if or when the person tries to quit.
- Ask students to think to themselves**: Have you ever seen someone battling an addiction?**
- Show students the Addicted Early Video https://vimeo.com/545568517 and facilitate a classroom discussion using **Session 1b "Addicted Early" Video Discussion Questions.**

KEY TALKING POINTS

- **Addiction: when you are unable to stop doing something that causes harm to yourself or others**
- **Dopamine: a neurotransmitter that helps us feel enjoyment, satisfaction, and pleasure**

Slide 4 | Learn, cont.

- Explain that there are five main types of flavor:
    - Sweet
    - Sour
    - Salty
    - Bitter
    - Savory
- Encourage students to have a discussion about their favorite food/drink product.
- Point out that many people prefer sweet flavors. Ask students: Why may this be?
- Distribute one **Session 1c: The Role of Taste** handout to students, and then encourage them to close-read independently or in pairs. Direct students to review the directions on their worksheet to complete the activity.

Slide 5 | Learn, Cont.

- Bring students' attention to the e-cigarette ads on the slide. Encourage them to think about the work they just completed as they view these ads.
- Then ask: How are e-cigarette manufacturers using sight and the science of flavor as an appeal to pull the public into trying vaping?

KEY TALKING POINTS

- **Humans' preference for sweet taste and flavors can be attributed to evolution.**
- **Animals tend to have a strong attraction to sweet flavors because it is a way for them to identify a readily available source of energy: glucose.**

Slide 6 | Learn, Cont.

- Explain that e-cigarette manufacturers add sweet, fruity flavors to their products to entice people to try them. This flavor can conceal the bitter taste of nicotine.
- Tell the class that adding sweet flavors and concealing the bitter taste of nicotine is dangerous because nicotine is a highly addictive chemical compound. Young people who are exposed to nicotine are at the highest risk for developing an addiction because their brains are still developing. Teens also face the risk of long-term consequences from nicotine use, such as impaired cognition (reduced working memory and attention span), and problems with emotional regulation.[5]
- Click once and share that studies indicate that...
  - People tend to falsely view non-menthol flavored e-cigarettes as less harmful.
  - Remind students that non-menthol flavored e-cigarettes are just as harmful.
  - Almost 85% of youth e-cigarette users use flavored products.[6]
  - People who used flavored e-cigarettes were nearly 3 1/2 times more likely to say they were addicted to these products compared to those who did not use flavors.[7]
  - In 2020, 53.4% of current e-cigarette users reported intention to quit vaping and 67.4% reported having tried to quit vaping.[8]
- Discuss:
  - **Based on these facts and what you have learned today, what conclusions can you draw about the use of flavors in e-cigarette products?**

5 https://www.fda.gov/tobacco-products/health-information/nicotine-addictive-chemical-tobacco-products
6 https://www.tobaccofreekids.org/what-we-do/industry-watch/e-cigarettes
7 https://newsroom.heart.org/news/study-finds-flavors-play-a-role-in-initiation-addiction-to-e-cigarette-use
8 https://pediatrics.aappublications.org/content/148/3/e2021050164

KEY TALKING POINTS

- **Most teens choose not to use e-cigarettes. However, those who do overwhelmingly use flavored e-cigarettes.**
- **Teens are attracted to e-cigarettes' sweet and fruity flavors, which can mask the bitter flavor of addictive nicotine.**
- **Young people who are exposed to nicotine are at the highest risk of developing an addiction because their brains are still developing.**
- **Young people who are exposed to nicotine are also at a higher risk of experiencing long-term health consequences.**

Slide 7 | Summary/ Wrap-up

Summary/Wrap-Up:

- Humans are attracted to sweet flavors, which is why tobacco companies produce flavored e-cigarettes.
- Flavored e-cigarettes attract teens, which can lead to nicotine addiction.

Before the class session ends, either collect the students' completed **Session 1c: The Role of Taste handouts** or instruct students to keep them in a safe place so they can be used in upcoming class sessions.

Session 2: Explore

Learning Objectives

Students will be able to:

- **Explain** how flavor is transmitted, both mechanically and chemically, when using an e-cigarette.
- **Compare** and **contrast** how flavors that affect the digestive system and the respiratory system function are regulated.
- **Describe** the dangers associated with e-cigarette flavors.

Overview

During this second session, students will seek to understand the harms associated with flavored e-cigarettes. They will rotate between three stations as they learn about the respiratory system and the digestive system, FDA regulations, and the effects that e-cigarettes have on the human body. They will then synthesize their learnings as they develop a short, easy-to-understand elevator pitch that they could give to a peer who believes e-cigarettes are not harmful.

Materials

- **Session 2a Capture Sheet: E-Cigarette Flavor Investigation**, one per student
- **Session 2b Stations**, ten copies to place at the three stations
- **Articles**, 10 copies to place at the E-Cigarette Flavors Station
  - tinyurl.com/2zcmpewm
  - tinyurl.com/5c2pddk7

Educator Prep

- Print out copies, one per student, of **Session 2a Capture Sheet: E-Cigarette Flavor Investigation**.
- Print out five copies of the **Session 2b Stations**.
- Print out 10 copies of the two articles:
  - tinyurl.com/2zcmpewm
  - tinyurl.com/5c2pddk7
- Decide where each of the four classroom stations will be. At each station, place several copies of the station's directions and the accompanying handouts. Also place copies of the two articles listed in the Materials sections above at the E-Cigarette Flavors Station.

Key Terms

- **Inhalation:** the process or act of breathing in; taking air and sometimes other substances into your lungs.
- **Digestion:** the process in the gastro-intestinal tract by which food is broken up physically, as by the action of the teeth, and chemically, as by the action of enzymes, and converted into a substance suitable for absorption and assimilation into the body.
- **E-liquid:** the liquid that is heated inside e-cigarettes. The main ingredient is usually propylene glycol (PG) or vegetable glycerin (VG). Most e-liquids also contain flavorings and nicotine.
- **Flavor additive:** natural or artificial substance that is added to give something a particular taste and smell.
- **FDA:** Short for the United States Food and Drug Administration, which is a federal agency of the Department of Health and Human Services.
- **Regulation:** an official rule or the act of controlling something.

Slide 8 | Explore

Teacher Note: Before the session begins, prepare the Session 2b stations around the classroom. Each station will need several copies of the station's directions and its accompanying handout(s).

- Begin the second session by asking students to recall what they have learned so far about the correlation between e-cigarette flavor and addiction: E-cigarette companies use sweet flavors to draw users in.
- Explain that there is another danger to e-cigarette flavor beyond its lure: the potential health impacts of the flavor itself.
- Explain that the class is about to complete an investigation into the dangers of e-cigarettes. To prepare students:
    - Divide the class into pairs.
    - Distribute one **Session 2a: E-Cigarette Flavor Investigation Capture Sheet** to each student.
    - Review the directions provided on the Capture Sheet and explain that students will rotate between stations as they gather information that they can use to answer the focus question.
    - Show students where each of the three stations are located.
    - Assign each pair a starting point and explain that they should rotate clockwise around the room. Pairs may move from station to station as they finish each one. Their goal is to finish all stations by the time there are 10 minutes left in class.
- Encourage students to begin.
- About every ten minutes, prompt students to wrap up their work and continue to the next station.

Slide 9 | Station Information

- Display this slide as students are rotating through the three stations.

Slide 10 | Summary/Wrap-Up

- When there are about 10 minutes left in the session, encourage students to look over their work. Challenge pairs to begin developing an elevator pitch, or a short, easy-to-understand summary, that they could give to a peer who believes e-cigarettes are not harmful. Encourage pairs to draw on their notes from all four stations.
- Ask a few pairs to share their pitch before the end of the class session. If needed, students may also finish their pitches for homework and share at the beginning of the following class session.
- Either collect the students' completed **Session 2a Capture Sheets** for safe-keeping or instruct them to keep them in a safe place until the following class session.

KEY TALKING POINTS

- **FDA regulation of e-cigarettes tries to prevent youth use of all kinds of nicotine products, including e-cigarettes. It does *not* ensure that e-cigarettes are safe to use.**
- **According to FDA.gov, the FDA " . . . has responsibility for regulating the manufacturing, marketing, and distribution of tobacco products to protect the public health and to reduce tobacco use by minors."**
- **In addition, the chemicals added for flavor react with the e-cigarette e-liquid when heated and create new compounds that can be dangerous when inhaled.**
- **Flavored e-cigarettes are not safe for young people to use.**

Session 3: Challenge

Learning Objectives

Students will be able to:

- **Describe** the role that flavors play in attracting teens to e-cigarette use.
- **Explain** the risk associated with using all types of e-cigarettes.
- **Articulate** the effects of all kinds of e-cigarettes on teens' brains and bodies.

Overview

In this third session, students will synthesize and apply what they have learned during the two previous sessions. They will work in pairs to create a PSA (public service announcement) ad campaign that educates their peers about the risks associated with using e-cigarettes and the role of flavor as appeal. They will begin their campaign during class and complete it for homework.

Materials

- **Completed Session 1b: The Role of Taste handouts,** one per student
- **Completed Session 2a Capture Sheets**, one per student
- **Session 3 Capture Sheet: Challenge**, one per student
- Devices with Internet access*, at least enough for half the class to share.
- Paper and drawing materials, for the class to share

  *If devices are not available, students may use the paper and art supplies to create their campaign.

Educator Prep

- Print out copies, one per student, of **Session 3 Capture Sheet: Challenge.**
- Be sure the devices are ready for student use.
- Assemble paper and drawing materials/art supplies for students who create hard copies of their campaigns.

Key Terms

- **Public Service Announcement**: A message shared with the public, in a variety of formats, with the objective of raising awareness around, or changing attitude/behavior towards, a social issue

Slide 11 | Challenge

- Introduce the following problem scenario to students by reading it aloud:

- The FDA has passed regulations to prevent youth from using e-cigarettes and has banned access to flavored e-cigarettes, but many misconceptions still exist. To combat teen vaping, create an ad campaign that educates your peers about the risks associated with using e-cigarettes and the role of flavor as appeal.

Slide 12 | Challenge, cont.

- Divide students into groups of three. Distribute a **Session 3 Capture Sheet: Challenge** to each student. Also instruct students to take out their **Session 1b: The Role of Taste handouts** and their **Session 2a Capture Sheets** from the previous class sessions (or redistribute them).
- Read the overview aloud. Then, explain that students' ad campaigns may take a format of their choice, as long as they address each of the following:
  - The role that flavors play in attracting teens to e-cigarette use
  - The risks associated in all kinds of e-cigarettes
  - The effects of all kinds of e-cigarettes on teen's brains and bodies
- Explain the following to prepare students for the Challenge:
  - Students should use the Capture Sheet for supplementary Internet research and note-taking.
  - Each group may decide how to create a final version of their campaign: using graphic design software, video, audio, pen and paper, etc. No matter what they decide, they may not show any person (or animal) using e-cigarettes in their campaign.
  - Tell students the deadline when they will be expected to have their campaign completed. They will be expected to finish their ads for homework and have them ready to present by the deadline.
  - Remind groups to refer to their completed work from previous sessions to guide them in developing their campaign.
- Finally, encourage them to begin!
- As the class session draws to a close, remind students of the date when their ad campaign must be complete.

Session 4: Reflect

Learning Objectives

Students will be able to:

- **Evaluate** what needs to be done to stop their peers from using e-cigarettes.
- **Identify** resources to help them quit vaping.

Overview

During this final session, student groups will present their ad campaigns to the class with a focus on their key points and overall strategy. Student audience members will evaluate the pros and cons of each campaign. They will eventually determine if they believe their ads could be enough to reduce the number of youth who try e-cigarettes and offer cessation to those who are using. The session will conclude with a presentation of free resources that students can use to help them quit vaping.

Materials

- **Session 4a Reflection Sheet**, one per student
- **Session 4b Resources to Help You Quit**, one per student

Educator Prep

- Print out copies, one per student, of **Session 4a Reflection Sheet.**
- Print out copies, one per student, of **Session 4b Resources to Help You Quit**

Slide 13 | Challenge, cont.

- Begin the final session by encouraging students to find their group members. Explain that each group will soon be presenting their ad campaign to the class.
- In two minutes or less, each group should explain:
  - The strategy behind their campaign
  - The key takeaways that they hope their peers will remember
- Give pairs 5-10 minutes to prepare their presentations.

Slide 14 | Reflection

- Pass out one **Session 4a: Reflection Sheet** to each student. Review the instructions and encourage students to jot notes as their classmates present.
- Lead the pairs through presenting their ad campaigns.
- Once each pair has presented, provide a quick summary of the presentations by reiterating that:

- All e-cigarettes are dangerous because they contain nicotine, which has numerous short-term and long-term effects on the human body. Manufacturers use flavors to mask some of the dangers of e-cigarettes, but flavored e-cigarettes are not less dangerous than other kinds of e-cigarettes.

- Then click and encourage students to share:
  - **Do you believe these ads could be enough to prevent your peers from using or trying e-cigarettes?**
  - **If not, what else needs to be done?**

Slide 15 | Summary/Wrap-Up

- Finally, conclude the sessions by sharing that if any students do use e-cigarettes or know people who use e-cigarettes, there are resources available to help them quit.
- Pass out a **Session 4b**: **Quitting Cheat Sheet** to each student. Encourage students to keep this resource in a safe place and/or share it with peers who may be in need of help.
- Take a minute to read through the cessation resources outlined on the handout. If time allows, click on the slide's hyperlinks to explore the web resources with your students.
- Also, share that students can always visit their school nurse, guidance counselor, or another trusted adult/educator if they would like additional support at school.
  - **Teacher Note:** *You can also share any local community support resources here as well.*

National Content Standards

Next Generation Science Standards

HS. Biological Evolution: Unity and Diversity

- HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
- HS-LS4.C: Adaptation: Disciplinary Core Ideas
    - Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not.
    - Adaptation also means that the distribution of traits in a population can change when conditions change.
    - Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment.

HS-LS2-8 Ecosystems: Interactions, Energy, and Dynamics

- Cross-Cutting Concept:
  Cause and Effect: Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.

Science and Engineering Practices

- Obtaining, Evaluating, and Communicating Information: Compare, integrate and evaluate sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a scientific question or solve a problem.

National Health Standards

- 1.12.5: Propose ways to reduce or prevent injuries and health problems.
- 3.12.1: Evaluate the validity of health information, products, and services.
- 8.12.2: Demonstrate how to influence and support others to make positive health choices.
- 8.12.4: Adapt health messages and communication techniques to a specific target audience.

Session 1a: Discussion Cards & Addiction Tracker

Caffeine	Shopping
Social Media	Sweet or Salty Foods

Directions:

1. Place the discussion cards face down in front of your group members.
2. Take a moment to independently review the Addiction Tracker and think about behaviors you have seen in yourself or others.
3. Next, draw the discussion cards one at a time as a group. For each one, consider and discuss the following:
    - Background: The more of these symptoms that someone has, the closer they are to having an addiction. Someone who has two or three symptoms has a mild substance use disorder whereas someone who has six or more symptoms is classified as addicted.
    - Question: Do you think this card (e.g., doing this activity or using this substance) could be addictive based on this criteria?
4. Once you have reviewed all four cards, discuss: How could these activities and substances get in the way of people's responsibilities?

Addiction Tracker, based on the DSM-V Criteria for Addiction

Impaired Control	Social Problems	Risky Use	Physical Dependence
I use this substance or do this activity more than I intend to.	I neglect (or let slide) responsibilities and relationships because of this substance or activity.	I use this substance or do this activity in settings that are risky or dangerous.	I need to use this substance or do this activity more and more in order to get the same effect.
I want to cut down on using this substance or doing this activity but I'm not able to.	I have given up activities I used to care about because of this substance or activity.	I continue to use this substance or do this activity even though I know it causes problems.	I have withdrawal symptoms (such as a headache, fever, anxiety, etc) when I don't use this substance or do this activity.
	I can no longer complete tasks at home, school, or work because of this substance or activity.		

Session 1b: "Addicted Early" Video Discussion Questions

Directions: Facilitate the following discussion questions with students after showing the "Addicted Early" video. Responses to reinforce with students are included under each question.

What are some signs that Jake is addicted?

Doing it early in the morning
Doing it when friends aren't around
Having negative consequences and still doing it (annoyed friends, team at risk, spending money instead of saving for the thing he wants)
Has to go home to get the pod

What is happening in his life because of that addiction? What could happen?

Possibly losing friends
Could get caught and in trouble
Cough
Could get kicked off the team
Spending his money

What can Mari do to help Jake?

Tell him about quitting resources
Don't vape again so that she can set a good example for Jake
Follow up about the info she gave him

Mari obviously doesn't want to vape. Should she still be friends with Jake?

Some will say yes—support him, don't judge him
Some will say no—He's a bad influence, he's putting vaping over their friendship
Teacher reassures kids that it is their own choice what friends they keep. The choice of whether or not to vape is a personal one and does not need to be defined by your friends. If you choose not to vape and decide to keep friends who do vape, it's important to know how to stick to the rules you've set for yourself.

Session 1c: The Role of Taste

Directions: Close-read the text below as you annotate for details that help you answer the question: Have humans evolved to prefer sweet tastes?

- Circle ideas or facts that you already knew
- Underline ideas or facts that are new learning for you
- Place a ? mark next to questions that you still have

Then use details from the text to respond to the question in the space provided.

Let's start by looking at the biology of flavor. In humans, bitter, sweet, sour, salty, and savory (or umami) flavors are detected by taste receptor proteins on our taste buds. Each of these proteins is produced by a different gene. Most vertebrates have three genes for sweet and savory flavors: T1R1, T1R2, and T1R3. These three genes came about more than 400 million years ago.

The proteins that these genes produce are located on the surface of our tongue cells. The bitter taste receptor is made up of a single protein, and the sweet and umami receptors are each made of two proteins that are joined together. When these proteins come in contact with particular chemicals, they react and help us detect different substances in our mouths.

In nature, the majority of molecules that are sweet are sugars found in plants such as fruit. These sugars provide glucose, which is a key source of energy. A sugar called lactose can also be found in many species' milk, which can be broken down to provide energy.

Throughout the centuries, humans' "sweet genes" or the ability to taste sweetness has been passed down from generation to generation. Scientists have concluded that humans, and many other animals, have continued to have an affinity for (or strong attraction to) sweetness because of the energy it provides. During humans' hunter and gatherer days, bitter foods could often be identified as dangerous whereas sweetness indicated that the food was beneficial. Fruit was a better source of energy than vegetables, and—during the early days of humanity—those that ate the most calories were the most likely to survive and reproduce. The human body evolved to rapidly convert sugar into fat, which our ancestors needed to be active during times of scarcity. This fat also supported the caloric needs of our larger brains and reproductive systems.

Whereas the genes of animals such as cats and most birds have mutated to not taste sugar, it is believed that human genes mutated early on to respond to sugar in order to encourage them to find more of this calorie-dense food. Foods higher in sugar, like

fruits, were often up in trees and took more energy to obtain. Without sweet flavor receptors, humans and other animals wouldn't have been motivated to search for this kind of food! This need or craving for sugary foods was therefore passed down from our ancient ancestors, who lived in an environment where sweet foods were much more rare than they are for us today. Today, even infants will respond positively to sweet flavors upon their first presentation.

The text above has been synthesized from four sources:

- Beauchamp, Gary. Why do we like sweet taste? A bitter tale. ncbi.nlm.nih.gov/pmc/articles/PMC5003684/
- Bramen, Lisa. The Evolution of the Sweet Tooth. https://www.smithsonianmag.com/arts-culture/the-evolution-of-the-sweet-tooth-79895734/
- Breslin, Paul. An Evolutionary Perspective on Food and Human Taste. researchgate.net/publication/236674545_An_Evolutionary_Perspective_on_Food_and_Human_Taste
- Evolution Accounts for Taste. Understanding Evolution. evolution.berkeley.edu/evolibrary/news/140903_hummingbirds

---

Why do humans today crave sweet tastes? Include details from the text to support your response.

Session 2a Capture Sheet: Flavored E-Cigarettes Investigation

Investigate: Research has shown that people view flavored e-cigarettes to be less harmful than other e-cigarettes. Review the information filled in below that summarizes what you have already learned about e-cigarettes. Then fill in the rest of the chart as you follow the directions at each station and further uncover if/how e-cigarettes and flavors affect the human body.

Health Effect of all E-Cigarettes on Teens	**Regulation**
● E-cigarettes contain nicotine, which is a highly addictive chemical compound. ● Young people who are exposed to nicotine are at the highest risk for developing an addiction because their brains are still developing. ● Teens also face the risk of long-term consequences from nicotine use. These long-term effects include: ○ impaired cognition in the parts of the brain that control attention, memory, and learning ○ problems with emotional regulation such as mood and impulse control and increased risk of mental health problems like anxiety and depression	

Body Systems	E-Cigarette Flavor Quick Facts

Are flavored e-cigarettes less harmful than other e-cigarettes? In the space below, develop an elevator pitch that you could give to your peers.

Remember: An elevator pitch is a short, easy-to-understand summary that you could say to someone in the amount of time it takes to ride an elevator with them!

Session 2b: Stations

Teacher Instructions: Place several copies of the instructions and readings below at each station.

Station Instructions: Body Systems

Instructions: With your partner, read the Body Systems handout about how the digestive system and the respiratory system process toxins.

Then in the space provided on your Capture Sheet:

1. Summarize the key differences between how the digestive system and respiratory system process toxins.
2. Explain the implications that this may have for using e-cigarettes. (Hint: Be sure to mention the role of the liver!)

Station Handout: Body Systems

Digestive System: What happens when you *ingest* a toxic substance?[9] [10]

When you ingest a toxic substance, it travels from your mouth, down your esophagus, and into your stomach. Your stomach holds it, along with food, while it is mixed with enzymes that try to break it down. The stomach's contents are then released into the small intestine.

In the small intestine, bile produced by the liver helps absorb toxins. These absorbed toxins eventually pass through the large intestine and are eliminated through feces. However, some toxins can also be absorbed into the bloodstream as the small intestine works to absorb nutrients.

If this happens, the liver comes into play again! Among many other jobs, the liver filters all of the blood in the human body. As it does this, it removes harmful chemicals, drugs, and toxins from the bloodstream. It breaks down and detoxifies these substances and then sends them on to exit the body through stool or urine.

It is important to note that while detoxification is one of the liver's main jobs, consistent exposure to toxic substances can still create serious harm.

Respiratory System: What happens when you *inhale* a toxic substance? [11][12]

When you inhale a toxic substance, the substance and the air it is in travels down your pharynx (throat) through your larynx (voice box), and into your trachea (windpipe). Your trachea is split into two air passages called bronchial tubes, which lead the toxins straight into the right and left lungs.

As toxins travel through the respiratory system, they are absorbed by the mucous membranes in the mouth, pharynx, larynx, trachea, and lungs which can seriously damage each of these organs. Toxins that make it to the lungs then pass quickly into the lung's capillaries, move into the bloodstream, and spread to each cell throughout your body. This absorption and spread of the toxins can happen extremely quickly.

[9] https://www.hopkinsmedicine.org/health/conditions-and-diseases/liver-anatomy-and-functions
[10] https://www.mayoclinic.org/diseases-conditions/toxic-hepatitis/symptoms-causes/syc-20352202
[11] https://www.clemson.edu/research/oes/manuals/labSafety/exposureRoutes.html
[12] https://my.clevelandclinic.org/health/articles/8960-lungs-how-they-work

Station Instructions: E-Cigarette Flavors

Instructions: Read both articles. You will learn about the ingredients in e-liquid, the chemical reactions that occur when you vape flavored e-liquid, and e-liquid's potential effects.

As you read each one, record at least two key facts about the effects of e-liquid in the space provided on your Capture Sheet.

Station Instructions: Regulation

Instructions:

1. Read the fact sheet provided as you learn about how the FDA regulates food and e-cigarette flavors.
2. On your Capture Sheet, jot: What are the key differences between the FDA's regulation of food and e-cigarette flavors, and why are these differences dangerous?

Station Handout: Regulation

Regulation Fact Sheet [13] [14] [15]

Food:

- The United States Food and Drug Administration (FDA) is a federal agency of the U.S. Government. According to FDA.gov, the FDA is responsible for "...protecting the public health by…ensuring the safety of our nation's food supply, cosmetics, and products that emit radiation."
- Food flavor ingredients are required to get approval from the FDA before they are allowed for human consumption. The FDA looks specifically at the flavors' toxicological data, the intended level of their use in foods, and whether they are deemed safe by the Flavor and Extract Manufacturers' Association (FEMA).
- The FEMA Expert Panel evaluates the safety of flavoring substances for their use in food, beverages and chewing gum.FEMA does not recommend the use of flavors for inhalation in e-cigarettes. It does not review flavor ingredients for exposures other than ingestion, which means for eating.
- Once a flavor is recognized as safe by FEMA, food manufactures do not have to provide information about the type and concentration of flavor additives on the product's label.

E-Liquid:

- According to FDA.gov, the FDA "…has responsibility for regulating the manufacturing, marketing, and distribution of tobacco products to protect the public health and to reduce tobacco use by minors."
- They are beginning to regulate the use of flavors more and have banned a lot of flavors so far but it is a long process to ban all flavors.
- E-cigarette companies currently flavor e-cigarettes with flavors listed as safe for human ingestion but not for inhalation into the lungs. This is currently allowed by the FDA.
- The concentration of flavors in e-cigarettes can be over 10,000 times higher than in food.
- FEMA does not support the use of flavors in vaping products in the absence of rigorous safety assessments performed by vaping product manufacturers and marketers that demonstrate safety.

[13] https://www.femaflavor.org/node/24344
[14] https://www.nature.com/articles/s41538-020-00075-y
[15] https://www.femaflavor.org/node/24344

Session 3 Capture Sheet: Challenge

Your Challenge: To combat teen vaping, create an ad campaign that educates your peers about the risks associated with using e-cigarettes and the role of flavor as appeal. Your campaign must consist of at least two different ads. It may take a form of your choice (visual, audio, audiovisual, etc.) as long as it addresses each of the following:

- The role that flavors play in attracting teens to using e-cigarettes;
- The risks associated with all kinds of e-cigarettes;
- The effects of all kinds of e-cigarettes on teen's brains and bodies.

Use the space below to record additional research, brainstorm, and/or organize your notes. Then, complete your ad campaign in a format of your choice. You will be sharing it with the rest of the class.

Session 4a Reflection Sheet

Directions: As you learn about your classmates' campaigns, consider if you believe their ads could be enough to prevent your peers from trying or using e-cigarettes. Jot notes in the chart below during the presentations to help you form a decision.

What key points and/or strategies may be successful in preventing your peers from trying or using e-cigarettes?	What points or strategies may not be successful? What problems (if any) may still exist despite these ads?

Session 4b Resources to Help You Quit

Want help to quit vaping? These resources are a good place to start.

- Web resource: teen.smokefree.gov/quit-vaping—includes personalized Quit Plan, how to deal with vape cravings and more.
- Texting resources: Text DITCHVAPE to 88709 or visit truthinitiative.org/thisisquitting to participate in a free and anonymous texting campaign.
- Phone, text, and/or online support: Register at mylifemyquit.com/My-Quit/Enroll_Now for free one-on-one support.

Want help to quit vaping? These resources are a good place to start.

- Web resource: teen.smokefree.gov/quit-vaping—includes personalized Quit Plan, how to deal with vape cravings and more.
- Texting resources: Text DITCHVAPE to 88709 or visit truthinitiative.org/thisisquitting to participate in a free and anonymous texting campaign.
- Phone, text, and/or online support: Register at mylifemyquit.com/My-Quit/Enroll_Now for free one-on-one support.

Want to quit vaping? These resources are a good place to start.

- Web resource: teen.smokefree.gov/quit-vaping—includes personalized Quit Plan, how to deal with vape cravings and more.
- Texting resources: Text DITCHVAPE to 88709 or visit truthinitiative.org/thisisquitting to participate in a free and anonymous texting campaign.
- Phone, text, and/or online support: Register at mylifemyquit.com/My-Quit/Enroll_Now for free one-on-one support.