

Vape Prevention: How Teachers Can Help



What Is Vape?

Electronic cigarette (e-cigarette) use is an emerging problem among youth, and is commonly referred to as "vaping" (CATCH, 2020; Selekman, 2019). E-cigarettes, similar to traditional cigarettes, allow users to inhale a nicotine-



based substance.

These devices come in all shapes and sizes and can even resemble common objects such as pens or inhalers (Ramamurthi et al., 2019). E-cigarettes also go by several names such as vape, mod, pen, electronic nicotine delivery system (ENDS), and JUUL.

Although there are numerous types of e-cigarette devices, they all have the same core pieces and functions. They consist of a battery, microprocessor (what turns on the device), heater (also known as the atomizer), and tank or cartridge,

(what stores the e-liquid; CATCH, 2020; Krishnan-Sarin et al., 2019). These devices come either prefilled with or can be manually filled with e-liquid flavoring. When a user activates the device by inhaling through the mouthpiece, the e-liquid is heated and undergoes chemical changes to produce an aerosol (i.e., pressurized substance; Callahan-Lyon, 2014; CATCH, 2020;). This aerosol is often referred to and mistaken as a harmless “vapor” when in fact it is not, and can cause significant harms. Figure 1 below represents a breakdown of common e-cigarette components (adapted from the U.S. Department of Health and Human Services [HHS], n.d.).

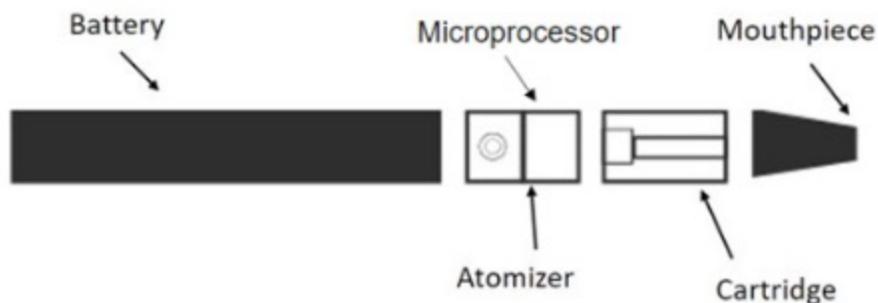


Figure 1: A visual representation of some common e-cigarette components including a battery, microprocessor, atomizer, cartridge, and mouthpiece (adapted from the U.S. Department of HHS, n.d.).

Not "Just Water Vapor"

When the aerosol produced by e-cigarettes is mistakenly called “water vapor,” it implies that it is safe and harmless, which it is not. Unlike water vapor, aerosol produced by e-cigarettes contain particles, chemicals, and elements that may cause a variety of negative health effects when inhaled (CATCH, 2020; Walley et al., 2019). Some of the currently known substances found in e-liquid and the effects on the body are listed in table below.

Ingredient Name	Effects on the Body
Nicotine (Also used in insecticides)	Alters the brain and habit-forming properties
Propylene Glycol (Also used in antifreeze)	Lactic acidosis and seizures
Diacetyl (Flavoring chemical)	Asthma, chronic pulmonary obstructive disorder, and popcorn lung
Acrolein (Component of smoke)	Dyslipidemia (i.e., elevated cholesterol) and is a respiratory irritant
Formaldehyde (Also used to preserve cadavers)	Eye, nose, and throat irritant; cancer-causing agent
Heavy Metals (Such as nickel, lead, and cadmium)	Damages lungs, kidneys, brain; cancer-causing agent

(Bein & Leikauf, 2011; Bhat et al., 2019; Catanzaro & Smith, 1991; CATCH, 2020; Clapp et al., 2017; Conklin et al., 2010; Dani & Balfour, 2011; Jensen et al., 2015; Kehrer et al., 2000; Rose, 2017; Vape Danger, n.d.; Zosel et al., 2010)

Nicotine Harms Students

False advertising leads people to believe that e-liquids do not contain nicotine. However, one study found that nearly 99% of e-liquids contain nicotine, even when they were labeled as "nicotine-free" (Marynak et al., 2017). Manufacturing companies aren't required to list all ingredients in the e-liquids, misleading what's actually in the product (Cobb et al., 2020). Students unaware of this could be using products they believe to be nicotine free, when they actually aren't.

Nicotine is known for its habit-forming properties (Dani & Balfour, 2011). Youth are at an increased risk of these habit-forming properties as the human brain is still developing until the approximate age of 25 years (CATCH, 2020; Dwyer et al., 2009). The use of nicotine before this age physically alters the brain and the synapse connections formed, increasing the likelihood of habitual use, future substance use disorders, marijuana use, and binge drinking (CATCH, 2020; Evans-Polce et al., 2020).

E-liquids have a high concentration of nicotine (Goniewicz et al., 2014). For example, the nicotine contained in a single JUUL pod (5% nicotine) is equal to the amount contained in an entire pack of 20 cigarettes (Singh et al., 2020). Youth are able to consume e-cigarette aerosols easily and quickly because added flavors suppress the bitterness of nicotine (Leventhal et al., 2020). Alternative methods used in e-cigarette products, such as adding nicotine salts to the top of the e-liquid, produce more nicotine, allowing users to inhale even more nicotine per use (Ramamurthi et al., 2019).

E-cigarettes & Substance Use



Due to the negative consequences of using e-cigarettes, the Center for Disease Control and Prevention (CDC) recommends that youth and young adults never try them and to quit if they are using them (CDC, 2020). Studies have shown that youth who vape are 6.8 times more likely to start smoking cigarettes than non-users (CATCH, 2020; Evans-Polce et al., 2020). In youth, e-cigarettes are considered a gateway substance as they have been known to lead to other substance use such as marijuana and binge drinking (Evans-Polce et al., 2020).

Associated Lung Illnesses

Lung Illnesses include asthma or bronchitis as well as more severe lung issues (Stalgaitis et al., 2020). E-cigarette use among youth is known for its association with certain lung illnesses. The flavoring chemical, diacetyl, is safe to ingest but not inhale through the lungs like it is through e-cigarette use (CATCH, 2020; Vas et al., 2019). Research shows that inhalation of diacetyl can cause Chronic Obstructive Pulmonary Disorder (COPD), popcorn lung (shortness of breath), and even increase asthma (Rose, 2017; Vape Danger, n.d.). Vitamin E acetate, an ingredient found in dab pens (a type of e-cigarette for marijuana use) is also known for its negative effects on the lungs (CATCH, 2020; Boudi et al., 2019). For example, in 2019, 13 Utah hospitals admitted 60 patients due to vaping, where 98% of the patients had respiratory symptoms and 55% were placed in intensive care (Blagev, et al., 2019). Furthermore, research suggests that youth who use e-cigarettes are 5 times more likely to be exposed to and diagnosed with COVID-19, compared to youth who do not use e-cigarettes (Gaiha et al., 2020). Additionally, the risk of contracting COVID-19 is 7 times greater for youth who smoke both e-cigarettes and traditional cigarettes (CATCH, 2020; Gaiha et al., 2020).

Signs & Health Impacts of Student Vape Use

Students should be taught about the side effects of e-cigarette use, and these side effects should not be dismissed as “normal teenage behavior.” **Cognitive symptoms** include difficulty concentrating as a result of nicotine dependence or withdrawal symptoms (CATCH, 2020; HHS, 2016). The use of products with nicotine may also have long-term effects on attention and memory (Stalgaitis et al., 2020). Youth may also show **behavioral changes** such as mood changes, anxiety, and irritability (CATCH, 2020; Popova et al., 2021). **Physical symptoms** include mouth sores, bloody nose, and dry mouth (Burt & Li, 2020; CATCH, 2020; Yang et al., 2020). Ensure youth learn about these and other side effects so they understand the dangers of e-cigarette use.

As teachers, you may find it helpful to be able to identify signs of use and ways youth can hide the devices. Below is a table that provides some common examples:

<p>Identifying Signs of Use:</p>	<ul style="list-style-type: none"> • Sudden difficulty concentrating • Decreased academic performance, increased missing assignments • Change in students' attendance and tardiness • Mood swings • Once easy going but now is anxious and irritable • Unexplained mouth sores, nosebleeds, and or irritation around the mouth • Constant headaches and nausea • Sweet smells coming from unsupervised areas
<p>Possible Hiding Places:</p>	<ul style="list-style-type: none"> • Car fobs • Candy dispensers • Office supplies (Sharpies, pens, flash drives) • Hoodie drawstrings • Backpacks (shoulder strap mouthpieces) • Phone cases • Smart watches • Inhalers • Makeup (lip stick tubes)

(California Department of Public Health, n.d.; CATCH, 2020; Ramamurthi et al., 2019; Schillo et al., 2020; Stalgaitis et al., 2020)

What Can Teachers Do?

Teachers have the unique opportunity to both monitor and influence student behaviors at school (Sallis et al., 2015) and have been specifically identified by the U.S. Surgeon General as crucial stakeholders to address youth e-cigarette use (HHS, 2016). Teachers can be effective in this role by:

- Staying informed and up-to-date on e-cigarette harms and products to be able to identify new products and inform students of potential risks of use (Schillo et al., 2020).
- Advocating for educational resources and curricula (such as CATCH My Breath) to be disseminated at school to provide this information, better intervene, and prevent e-cigarette use (Schillo et al., 2020).
- Advocating for comprehensive school tobacco policies that specifically include vaping and JUUL prevention to ensure a tobacco-free space at school (Schillo et al., 2020).
- Helping students understand the harms of e-cigarette use (HHS, 2016).

There are several resources available including lesson plans, additional education on e-cigarettes, and trainings on how to identify if youth are using e-cigarettes. Below is a brief list of resources with additional information to learn more or get started.

Online Resources

<p>Be Epic, Escape the Vape</p> <p>Resources for parents, teachers and youth</p> <p>https://extension.usu.edu/be-epic/</p>	<p>CATCH My Breath</p> <p>Free lesson plans, PowerPoints, and worksheets</p> <p>https://letsgo.catch.org/</p>
<p>Scholastic</p> <p>Lessons, activities and digital tools</p> <p>https://www.scholastic.com/youthvapingrisks/index.html</p>	<p>Rethink Vape</p> <p>Factual information about e-cigarettes</p> <p>https://rethinkvape.org/resources/</p>
<p>The Real Cost</p> <p>Factual information about e-cigarettes</p> <p>https://therealcost.betobaccofree.hhs.gov/</p>	<p>Truth Initiative</p> <p>Research and information about e-cigarettes</p> <p>https://truthinitiative.org/research-resources/topic/emerging-tobacco-products?subtopic%5B68%5D=68</p>

Here are a few resources to give your students for help or ways to quit.

Resources for Students to Quit

- Text 'QUIT' to 47848
- Text 'DITCHVAPE' to 88709
- 1-800-QUIT-NOW
- <https://truthinitiative.org/thisisquitting>

*Please note that all of the resources provided are for educational purposes and Utah State University (USU) does not specifically endorse their services. Resources are intended to provide information, not to treat substance use/vape use or other mental health concerns. USU does not control the websites or books referenced above.

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