



## Nicotine and the Teen Brain

While student smoking rates have declined in recent years, e-cigarette use has risen—an alarming trend, because most vaping devices contain the highly addictive drug nicotine. Share the article “How Nicotine Affects the Teen Brain” to help students understand how nicotine is not only highly addictive but also can cause lasting effects on their brain. Then have students complete the “Vaping Health Risks” presentation activity to guide them to conduct deeper research into specific vaping risks and help spread the word to their peers.

### Reading-Comprehension Questions

**1** Describe how the brain’s reward system works. (*The brain’s reward system is activated when you experience something enjoyable, like laughing with friends. That causes a release of the natural chemical dopamine. Dopamine helps your brain note this activity as something that should be remembered and repeated.*)

**2** What is addiction? (*Addiction is a brain disorder that causes a person to continue to seek out and use a drug despite negative consequences in their lives.*)

**3** Explain how using nicotine can lead to addiction. (*When someone uses nicotine, it causes the brain to release dopamine. Nicotine causes a larger- and longer-than-normal release of dopamine. The surge in dopamine causes a strong reaction in the reward system, so the person feels a strong desire to use nicotine again. Over time, this leads to addiction.*)

**4** Why are teens especially vulnerable to nicotine addiction? (*The adolescent brain is still developing and won’t be fully mature until the person reaches their mid-twenties. Because it is still developing, the brain is more vulnerable to the changes caused by nicotine.*)

**5** Explain one reason it can be challenging for someone who is addicted to nicotine to quit. (*If someone who is addicted to nicotine tries to quit, they can experience uncomfortable withdrawal symptoms, including depression and powerful cravings, that make it hard to stop.*)

**6** What are some ways teens can help support a healthy development

of their brains? (*Don’t use drugs like nicotine. Take on new challenges that have a positive and stimulating influence on brain development, such as learning a new skill.*)

### Critical-Thinking Writing Prompts

**Grades 6–8** Both conventional cigarettes and vaping devices are illegal for teens. Write an argument to support the existence of this law. Include supporting evidence.

**Grades 9–10** How does the brain’s reward system reinforce certain types of behavior? Explain how this can have positive and negative effects on a person’s development.

**Grades 11–12** Some people who use nicotine report using it because they think it helps them relax. Explain why, in reality, nicotine can have the opposite effect. Then, suggest healthier alternatives for relaxation.

### Remote Learning Suggestions

Send students links or print copies of the student article and student activity, and instruct them to read independently. Share the reading-comprehension questions on a digital discussion board, on a video call, through email, or in a print packet, and have students respond online or in hard copy. When students have completed the student activity, presentations can be delivered over a class video call, through a prerecorded video clip, or by sharing links or attachments. Wrap up by having students share (digitally or in writing) 3–5 new things they learned or thought about in a new way as a result of their classmates’ presentations.

#### Subject Areas

- Science, Biology, Public Health
- English Language Arts
- Health/Life Skills

#### Standards, Grs. 6–12

##### Common Core State Standards (CCSS)

###### RI.2

- ▶ Determine central ideas or themes of a text; summarize key supporting details

###### RI.9

- ▶ Analyze how two or more texts address similar topics

###### SL.4

- ▶ Present information and supporting evidence appropriate to task, purpose, and audience

##### Next Generation Science Standards (NGSS)

**MS-LS1.D/HS-LS1.D** Information Processing

**Practice** Obtaining, Evaluating, and Communicating Information

**Cross-Cutting Concept** Cause and Effect: Mechanism and Prediction

#### Additional Lesson Resources

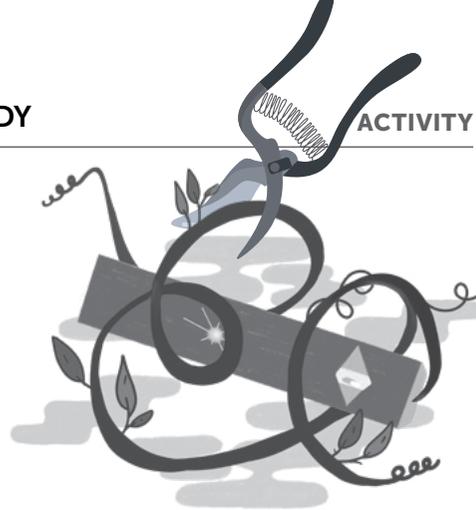
**Vocabulary Support:** Download terms and definitions at [scholastic.com/headsup/how-nicotineaffectsthetenbrain](http://scholastic.com/headsup/how-nicotineaffectsthetenbrain)

**More Lessons** on Science and Health:

- ▶ [headsup.scholastic.com/teachers](http://headsup.scholastic.com/teachers)
- ▶ [teens.drugabuse.gov](http://teens.drugabuse.gov)

# Vaping Health Risks: Presentation Activity

Many teens don't know the real health risks of vaping or assume it is safer than smoking conventional cigarettes. Follow the steps below to create a presentation to help your peers get the real facts.



## STEP 1: RESEARCH AND GATHER INFORMATION

Read the passage below, then explore the links in the Find Out More section beneath it. As you read, make notes of details you think teens should know about the health risks of vaping and nicotine.

### What Are the Dangers of Vaping?

Recent surveys show that the number of teens who have tried vaping devices (also called e-cigarettes) is on the rise. While many kids assume that e-cigarettes are safe, the truth is that vaping is harmful to teens in many ways.

All vaping devices basically work the same. When someone puffs on the mouthpiece, a battery heats up a liquid made up of chemicals like nicotine and flavoring. The liquid gets turned into an aerosol that the user inhales. (The aerosol resembles a vapor—that's where vaping gets its name.)

Almost all vaping devices, including Juul products and Puff Bars, contain nicotine. Found naturally in tobacco, nicotine is especially harmful to teens because their brains are still developing. Using nicotine can affect parts of the brain that control learning and attention as well as cause addiction. In fact, the number of teens who say they use e-cigarettes because they are "hooked" more than doubled between 2018 and 2019.

Teens who vape may not realize how much nicotine they're being exposed to. The nicotine content of one Juul cartridge and some Puff Bars is the same amount found in an entire pack of cigarettes.

Vaping also exposes people to other dangerous materials. Flavoring chemicals are added to many vaping liquids, which can be harmful if inhaled into the lungs. Vaping aerosols may also contain formaldehyde—a hazardous chemical that can cause cancer—and toxic metals like cadmium.

## STEP 2: CREATE YOUR PRESENTATION

Think about how you can use information you've gathered to create a presentation that will help your peers understand the dangers of vaping. Be creative! For example, test your classmates' knowledge by creating one of the following:

- **Online quiz game** (try using the game platform Kahoot!)
- **Flip cards with questions about key facts**
- **Video**
- **Blog post**
- **Collection of sample social media posts**
- **Choose your own idea!**

Make sure your presentation includes important facts and surprising details that will capture your audience's attention. Be sure your facts come from trusted sources only.

### Find Out More

• **Vaping Risks interactive:** [scholastic.com/headsup/vapingrisksinteractive](https://www.scholastic.com/headsup/vapingrisksinteractive)

• **Three Surprising Risks From Vaping:** [teens.drugabuse.gov/vapingrisks1](https://www.teens.drugabuse.gov/vapingrisks1)

• **Monitoring the Future 2019: The Highs and Lows of Vaping:** [teens.drugabuse.gov/vapingrisks2](https://www.teens.drugabuse.gov/vapingrisks2)