



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. 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 disorder that causes a person to continue to use a drug despite negative consequences.)*

3 Explain how using nicotine can lead to addiction. *(When someone uses nicotine, the brain releases a surge of dopamine that lasts longer than it would with other enjoyable activities. The surge in dopamine makes the person want more nicotine. Over time, this can lead to addiction.)*

4 Why are teens especially at risk for nicotine addiction? *(The teen 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 harmful effects of nicotine.)*

5 Give one reason it can be hard for someone who is addicted to nicotine to quit. *(If someone who is addicted to nicotine tries to quit, they can have withdrawal symptoms and feel the need to vape to relieve their symptoms.)*

6 Give one example of how teens can support their brains in a

healthy way. *(Teens can take on new challenges, like learning to cook or playing an instrument, to support their brain development.)*

Critical-Thinking Writing Prompts

Grades 6–8 Both conventional cigarettes and vaping devices are illegal for teens. Write an argument to support this law.

Grades 9–10 How does the brain’s reward system reinforce nicotine use? Explain how this can have a negative effect on a person’s development.

Grades 11–12 Some people use nicotine to help them relax. Explain why nicotine can have the opposite effect. Then, suggest one healthy alternative 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) 2–3 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

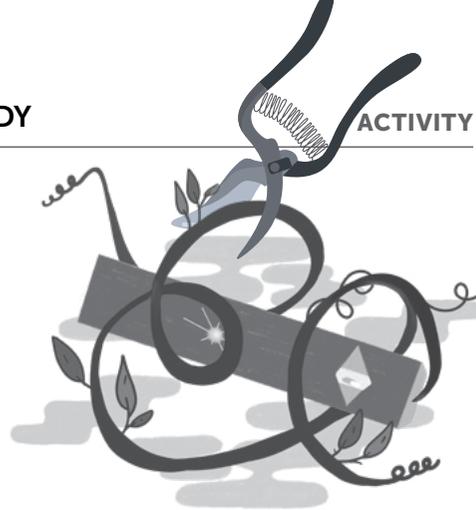
More Lessons on Science and Health:

- ▶ headsup.scholastic.com/teachers
- ▶ teens.drugabuse.gov



Vaping Health Risks: Presentation Activity

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



STEP 1: RESEARCH AND GATHER INFORMATION

Read the passage below, then explore the links in the Find Out More section. 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?

Some teens assume that vaping (or using e-cigarettes) is safe, but it is very harmful.

How does vaping work? When someone puffs on the mouthpiece, a battery heats a liquid made of chemicals. The liquid turns into an aerosol, or vapor, that the user inhales.

Almost all e-cigarettes contain nicotine. Nicotine is especially harmful to teens because their brains are still developing. Using nicotine can affect learning and can lead to addiction. The number of teens who report being “hooked” on e-cigarettes more than doubled between 2018 and 2019.

Teens who vape may not realize how much nicotine they're being exposed to. One Juul cartridge and some Puff Bars contain the same amount of nicotine as a pack of cigarettes.

Many vaping liquids contain flavoring chemicals that can be harmful if inhaled. Vaping aerosols may also contain formaldehyde—a cancer-causing chemical—and toxic metals like cadmium.

STEP 2: CREATE YOUR PRESENTATION

How can you use information you've gathered to 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!**

Your presentation should include important facts and surprising details to capture your audience's attention. Be sure your facts come from trusted sources only.

Find Out More

• **Three Surprising Risks From Vaping:**
teens.drugabuse.gov/vapingrisks1

• **Vaping Risks interactive:**
scholastic.com/headsupvaping/risksinteractive

• **Monitoring the Future 2019: The Highs and Lows of Vaping:**
teens.drugabuse.gov/vapingrisks2