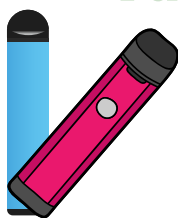


# Vaping Harms: Test Your Knowledge



Instructions: Read each statement. Circle if you think the statement is a MYTH (false) or a FACT (true).

1. The “cloud” from an e-cigarette is water vapor and harmless. MYTH FACT
2. e-cigarettes are to help people quit smoking. MYTH FACT
3. e-cigarettes contain nicotine. MYTH FACT
4. You have to be 18 years old to buy or use vaping products. MYTH FACT
5. Nicotine is an addictive chemical. MYTH FACT
6. Vaping (the use of electronic devices) affects brain development. MYTH FACT
7. Flavored e-liquids, like fruit, mint and candy are not dangerous. MYTH FACT
8. You won't get addicted to nicotine unless you use it every day. MYTH FACT
9. Secondhand exposure to vapor released from e-cigs is harmful. MYTH FACT
10. When using e-cigs, there is a risk of explosions of electronics and batteries. MYTH FACT
11. The FDA currently regulates the chemical ingredients in vaping. MYTH FACT
12. Vaping devices are safe. MYTH FACT

**Pair up. Review your responses with others.**

**Circle which statements (numbers) you answered the same: 1 2 3 4 5 6 7 8 9 10 11 12 13**

**Circle which statements (numbers) you answered different: 1 2 3 4 5 6 7 8 9 10 11 12 13**

**Talk about which of these statements confused you and why?**

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**Review the statements about marijuana below. Circle the ones that surprised you the most.**

- 1. MYTH: The “cloud” from an e-cigarette is water vapor and harmless.**  
**SCIENCE:** Many people incorrectly believe that these devices produce a water vapor when in fact they create aerosols that contain harmful chemicals. The aerosol inhaled from e-cigarettes and JUULs is often a mixture of harmful chemicals like nicotine, formaldehyde—which is known to cause cancer—and acrolein—which is used as a weed killer and can cause irreversible lung damage.  
American Lung Association, E-cigarettes & Vaping What Teens Should Know. <https://www.lung.org/getmedia/5eccc29b-b181-48b3-97eb-ad402a7957d6/e-cigarettes-teens.pdf.pdf?ext=.pdf>
- 2. MYTH: e-cigarettes are to help people quit smoking.**  
**SCIENCE:** The World Health Organization (WHO) does not consider electronic cigarettes to be a legitimate smoking cessation aid. No e-cigarette has been found to be safe and effective to help people quit smoking.  
American Lung Association, E-cigarettes & Vaping What Teens Should Know. <https://www.lung.org/getmedia/5eccc29b-b181-48b3-97eb-ad402a7957d6/e-cigarettes-teens.pdf.pdf?ext=.pdf>
- 3. FACT: e-cigarettes contain nicotine.**  
**SCIENCE:** Nicotine is a toxic, colorless or yellowish liquid that is the chief active component of tobacco. Nicotine is addictive and can harm adolescent brain development, which continues into the early to mid-20s. Nicotine content in e-cigs are highly variable as labeling is not always a reliable indicator.  
CDC, Quick Facts on the Risks of E-cigarettes for Kids, Teens, and Young Adults. <https://shorturl.at/dlFY4>
- 4. MYTH: You have to be 18 years old to buy or use vaping products.**  
**SCIENCE:** In December 2019, a federal Tobacco 21 law was passed to raising the national purchase age for all tobacco products, including e-cigarettes, to 21 years old.  
FDA, Tobacco 21, <https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/tobacco-21>
- 5. FACT: Nicotine is an addictive chemical.**  
**SCIENCE:** Nicotine is highly addictive. Nicotine releases dopamine in the same regions of the brain as other addictive drugs (like heroin and methamphetamine). It causes mood-altering changes that make a person temporarily feel good.  
CAMH, Nicotine Dependence, <https://shorturl.at/grl47>
- 6. FACT: Vaping (the use of electronic devices) affects brain development.**  
**SCIENCE:** Exposure to nicotine during adolescence can harm a young person’s developing brain and affect memory, concentration, learning, self-control, attention and mood.  
American Lung Association, E-cigarettes & Vaping What Teens Should Know <https://www.lung.org/getmedia/5eccc29b-b181-48b3-97eb-ad402a7957d6/e-cigarettes-teens.pdf.pdf?ext=.pdf>

**7. MYTH: Flavored e-liquids, like fruit, mint and candy are not dangerous.**

**SCIENCE:** The liquid used in e-cigarettes often contains nicotine and flavorings. This liquid is sometimes called “vape juice,” or “vape liquid.” E-juice and JUUL pods flavored like fruit, mint or other treats carry the same health risks as the unflavored products. Flavors are a great way to attract young consumers.

American Lung Association, E-cigarettes & Vaping What Teens Should Know <https://www.lung.org/getmedia/5ecc29b-b181-48b3-97eb-ad402a7957d6/e-cigarettes-teens.pdf.pdf?ext=.pd>

**8. FACT: You won't get addicted to nicotine unless you use it every day.**

**SCIENCE:** Nicotine is highly addictive — some say it's as addictive as cocaine, heroin and alcohol. Using nicotine just one time puts you at risk of becoming dependent on the drug because of its immediate effect on a young person's brain.

Cleveland Clinic, Nicotine Dependence (Tobacco Use Disorder), <https://my.clevelandclinic.org/health/diseases/24482-nicotine-dependence>

**9. FACT: Secondhand exposure to vapor released from e-cigs is harmful.**

**SCIENCE:** Aerosols from vaping contain heavy metals, such as lead, nickel and zinc, cancer-causing substances such as benzene, and diacetyl, which has been linked with a condition nicknamed “popcorn lung.” Research has found that exposure to secondhand aerosols is associated with increased risk of bronchitis symptoms and shortness of breath among young people, especially among those who don't smoke or vape themselves.

American Heart Association, In secondhand vape, scientists smell risk, May 31, 2022, <https://www.heart.org/en/news/2022/05/31/in-secondhand-vape-scientists-smell-risk>

**10. FACT: When using e-cigs, there is a risk of explosions of electronics and batteries.**

**SCIENCE:** Throughout the past few years, the medical community encountered increasing episodes of burn injuries secondary to e-cigarette battery explosion. These explosions occur through “thermal runaway.” This process occurs when the battery overheats and the internal battery temperature increases dangerously high, to the point of inner fire and explosion.

NIH, E-Cigarette Battery Explosions: Review of the Acute Management of the Burns and the Impact on Our Population, 2019 Aug 11, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6783228/>

**11. MYTH: The FDA currently regulates the chemical ingredients in vaping.**

**SCIENCE:** The FDA does not currently regulate chemical ingredients and labels of vapes. The FDA does not regulate the cleanliness of facilities that produce chemical ingredients used to make e-juice.

Stanford University, Tobacco Prevention Toolkit, [www.tobaccopreventiontoolkit.stanford.edu](http://www.tobaccopreventiontoolkit.stanford.edu)

**12. MYTH: Vaping devices are safe.**

**SCIENCE:** Electronic vaping devices are still very new. Long-term health consequences of vapes are still not known. However, there is growing evidence showing that these devices are not harmless.

Stanford University, Tobacco Prevention Toolkit, [www.tobaccopreventiontoolkit.stanford.edu](http://www.tobaccopreventiontoolkit.stanford.edu)



# Electronic Vaping Devices: How Much do you really know?

Instructions: Check your knowledge of where vape devices come from and what the parts of a vape device are.

**Where did vaping devices come from?**

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## How has vaping evolved?

According to the U.S. Customs and Border Protection Agency, electronic cigarettes were introduced to the U.S. in 2006 (first import ruling dated August 22, 2006. NY M85579) and have evolved many times since then. The most recent generation of e-cigarettes on the market contain refillable cartridges and use nicotine salts in the e-liquids. The nicotine salt formulas allow for much higher levels of nicotine compared to earlier generations of e-cigarettes.



Source: Catch My Breath, Train the Trainer, August 2023

Source: CASAA, Historical Timeline of Vaping Cigarettes, <https://casaa.org/education/vaping/historical-timeline-of-electronic-cigarettes/>

**LET'S GUESS: How many cigarettes do you think are in each of the following?**

CIGS IN AN E-CIG

<div style="background-color: white; border-radius: 15px; padding: 5px; display: inline-block;">1 Pack of Cigarettes = -22mg of Nicotine</div>	<div style="background-color: white; border-radius: 15px; padding: 5px; display: inline-block;">1 JUUL Pod = -41.3mg of Nicotine</div>	<div style="background-color: white; border-radius: 15px; padding: 5px; display: inline-block;">1 Flum Float = -400mg of Nicotine</div>	<div style="background-color: white; border-radius: 15px; padding: 5px; display: inline-block;">1 Elf Bar = -650mg of Nicotine</div>
<div style="background-color: white; width: 100px; height: 40px; margin: 0 auto;"></div>	<div style="background-color: white; width: 100px; height: 40px; margin: 0 auto;"></div>	<div style="background-color: white; width: 100px; height: 40px; margin: 0 auto;"></div>	<div style="background-color: white; width: 100px; height: 40px; margin: 0 auto;"></div>

## KEY:



- One standard pack of cigarettes contains 20 cigarettes. There is about 1 to 1.2 mg of nicotine absorption per cigarette, about 22 milligrams of nicotine delivered to the body from a whole pack.
- One JUUL pod is equal to 2 packs of cigarettes.
- One Flum Float is equal to 18 packs of cigarettes.
- One Elf Bar is equal to about 30 packs of cigarettes.
- The amount of nicotine in these e-cig products is **high** and can be intense for first-time smokers.
- A major concern is that young people are being introduced to high amounts of nicotine in e-cig products, which increases their risk to developing tolerance and addiction issues.

Source: Stanford Medicine, Tobacco Prevention Toolkit, <https://med.stanford.edu/tobaccopreventiontoolkit/take-and-teach/toolkit-factsheets.html>



# Test your IQ: Electronic Vaping Devices

Instructions: Match the correct letter with the correct part of the e-cigarette.

## COMPONENTS OF E-CIGARETTES

A. Heater/Atomizer

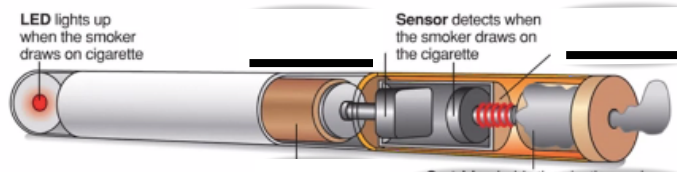
B. Battery/Power

C. Cartridge/Tank

D. Microprocessor

### HOW AN ELECTRONIC CIGARETTE WORKS

Smokeless cigarettes, or electronic cigarettes, do not burn tobacco directly. They deliver nicotine into an atomizing chamber, where it is heated and turned into vapor. The vapor is drawn into the body the same way as a regular cigarette is smoked:



E-cigarettes have many parts. They have an electronic battery to operate it. A cartridge or tank to absorb liquid material, including nicotine, e-liquids, e-juices (flavors), and other chemicals.

The battery allows the atomizer to heat the liquid, which creates an aerosol that is breathed into the lungs and breathed out into the air repeatedly.

Some of these devices are pre-loaded with e-juice and some require it to be added.

## COMPONENTS OF E-CIGARETTES

Heater/Atomizer

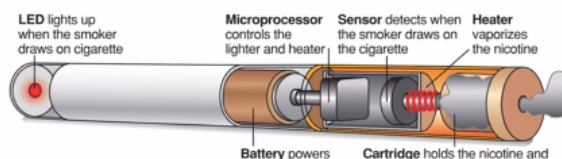
Battery/Power

Cartridge/Tank

Microprocessor

### HOW AN ELECTRONIC CIGARETTE WORKS

Smokeless cigarettes, or electronic cigarettes, do not burn tobacco directly. They deliver nicotine into an atomizing chamber, where it is heated and turned into vapor. The vapor is drawn into the body the same way as a regular cigarette is smoked:



# VAPING: PUBLIC HEALTH INDICATORS

*What are the benefits?*



What do you think vape juice is?

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What are some flavors you have seen or heard of?

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How do you think different e-liquid flavors affect vaping experiences and health?

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## E-JUICE: SWEET FLAVORS ABOUND



E-LIQUID



FOOD PRODUCT



E-LIQUID



FOOD PRODUCT



E-LIQUID



FOOD PRODUCT



E-LIQUID



FOOD PRODUCT

# 81%

of kids who ever used tobacco products **started** with a **flavored product**.

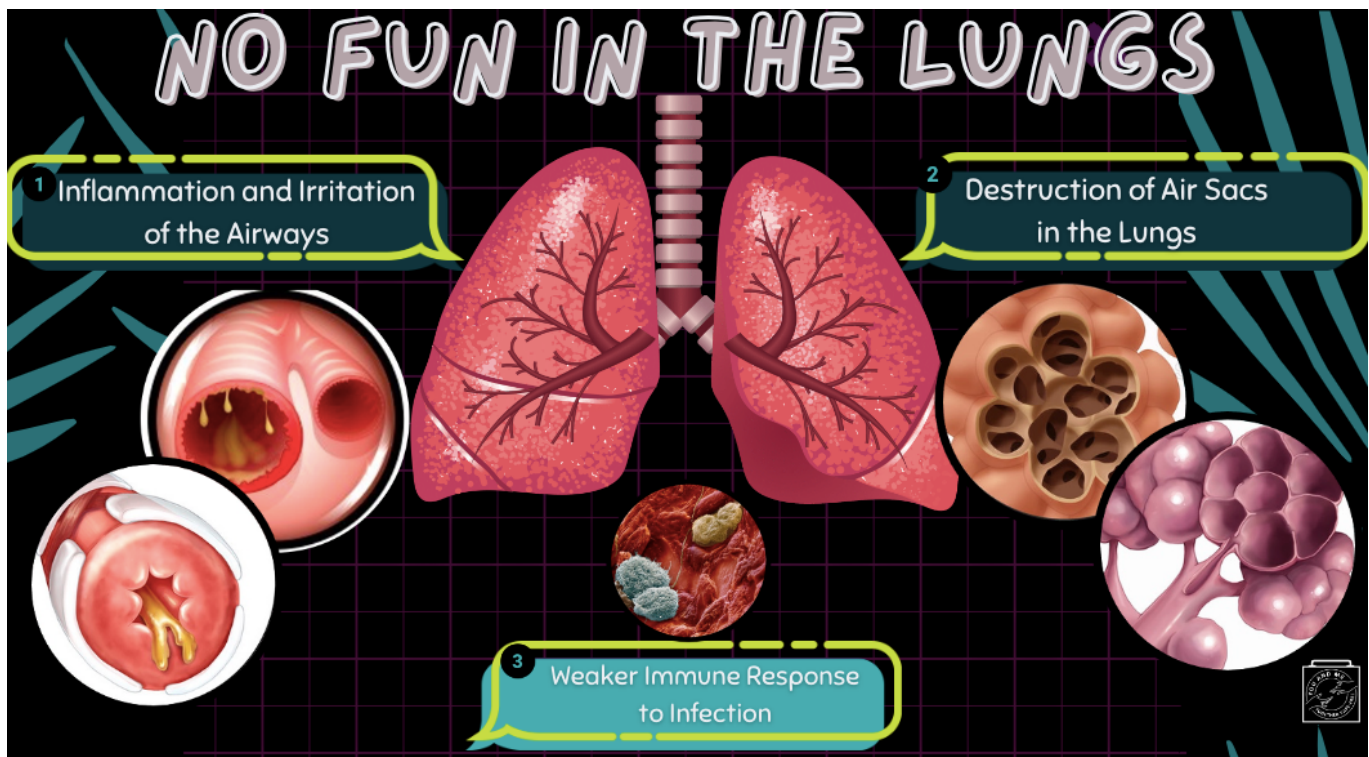
# 99%

of E-Cigarettes sold in 2015 **contained nicotine**.

# Did You Know?

- The most common vape juices are flavored with appealing tastes that young people like, such as: menthol, mint, all types of fruits, sweet desserts, and candy.
- The e-liquid contained in e-cigarettes can be harmful when heated (aerosolized) and inhaled. Examples include: cinnamaldehyde (cinnamon), vanillin (vanilla). These flavors are harmful when aerosolized.

The picture below shows how the heated and smoked aerosols from flavored e-juices negatively affect the body.



LET'S THINK!

What is something that you learned about the impacts of e-liquid flavors on the body that you will share with others?

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# RAISING AWARENESS: PUBLIC HEALTH POLICY AND SMOKING TRENDS

Reflect and write in the space provided the different types of tobacco laws and policies that are instituted in society.

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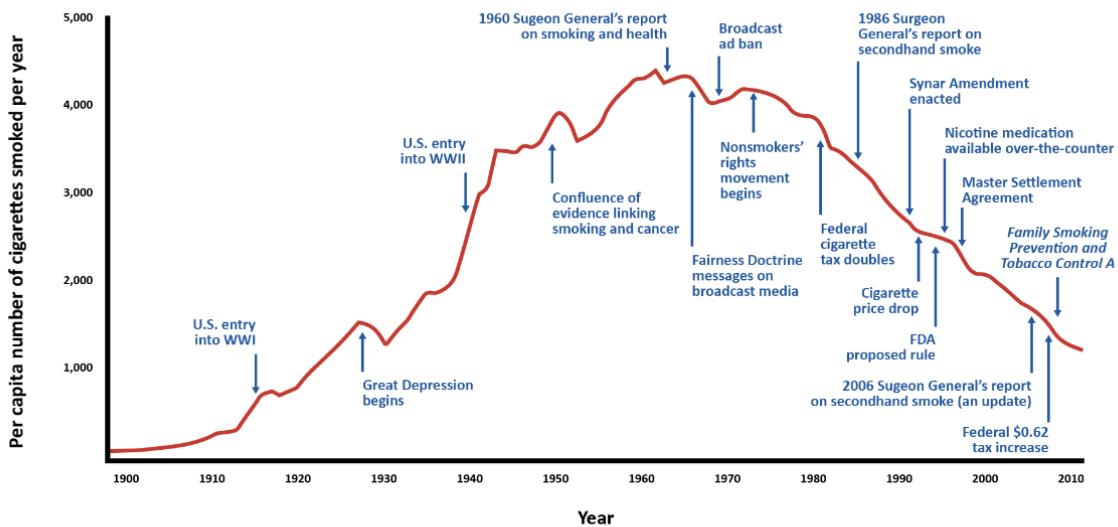


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Instructions: Review the **Figure** below on public health smoking legislation implemented in the U.S. and how they are related to smoking behaviors over the years (trends).



## Public Health Legislation and Smoking Trends



Sources: Adapted from Warner 1985 with permission from Massachusetts Medical Society, ©1985; U.S. Department of Health and Human Services 1989; Creek et al. 1994; U.S. Department of Agriculture 2000; U.S. Census Bureau 2013; U.S. Department of the Treasury 2013.  
Adults ≥ 18 years of age as reported annually by the Census Bureau.

What do you notice? How do the public health policies affect smoking trends? (Hint: is there an increase, decrease, or no impact?)

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# VAPING AND THE DEVELOPING BRAIN

The brain is a mystery to a lot of people! Did you know that your brain weighs 3 pounds? This is amazing given that it is very complex. It is called the command center for your entire body, as it controls everything, from the things we see and feel to the actions we engage in.

## TEST YOUR KNOWLEDGE

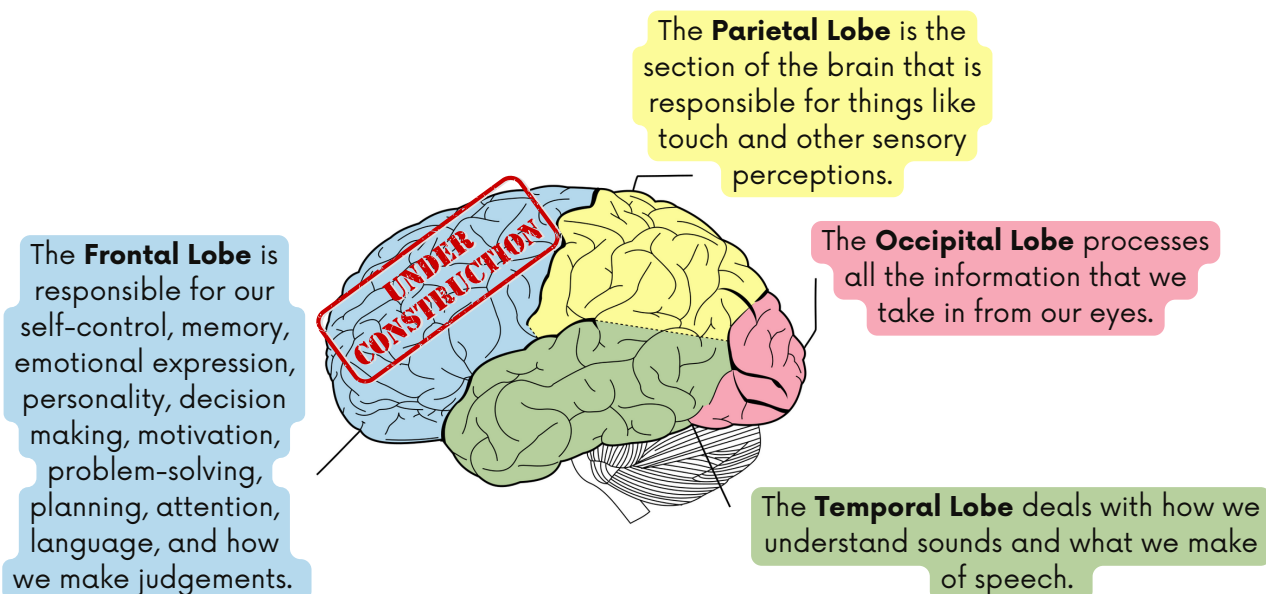
Up to what age is your brain still in development?

- 18       21       25       27       30

Which area of the brain is still in development into adulthood?

- Frontal Lobe       Parietal Lobe       Occipital Lobe  
 Temporal Lobe

The diagram below shows the four lobes of the brain. As you can imagine, each area of the brain has a different function and purpose it serves. Take some time to study the image of some of the key areas of your brain below.



Did you know that the **right frontal lobe** of the brain is where pleasure seeking starts and that it shrinks for young people who smoke regularly? This impacts the way one seeks pleasure and can lead to addiction.

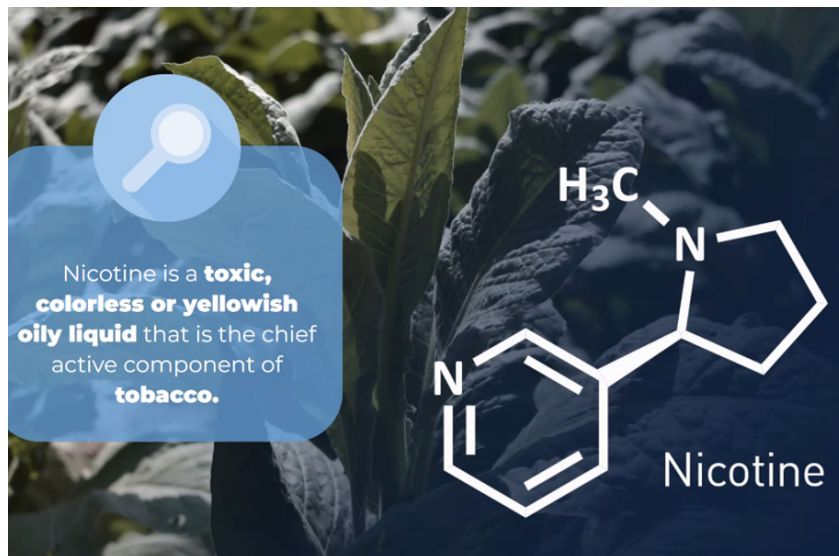


# WHAT IS NICOTINE?

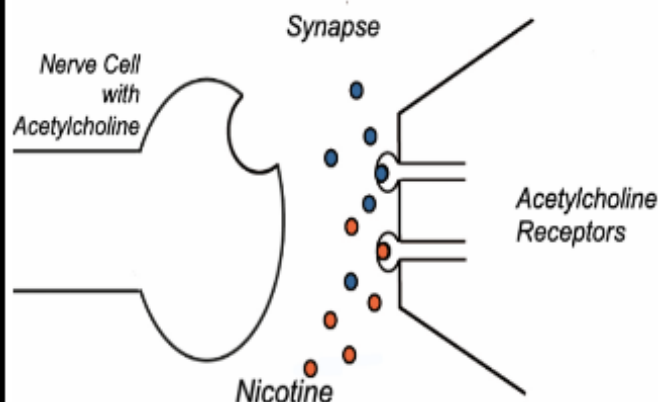
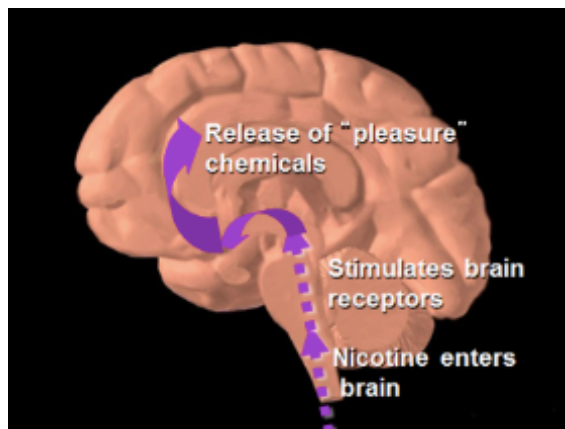
Nicotine is made up of different chemical compounds (2 nitrogen-containing heterocycles, pyridine and pyrrolidine).

This chemical compound acts as a “psychoactive stimulant.” This means that when smoked, nicotine enters the bloodstream and crosses the blood-brain barrier to affect the brain and body. As a stimulant, it binds to Acetylcholine receptors in the brain’s reward pathway that release dopamine - causing the person feel more alert, awake, and pleasure.

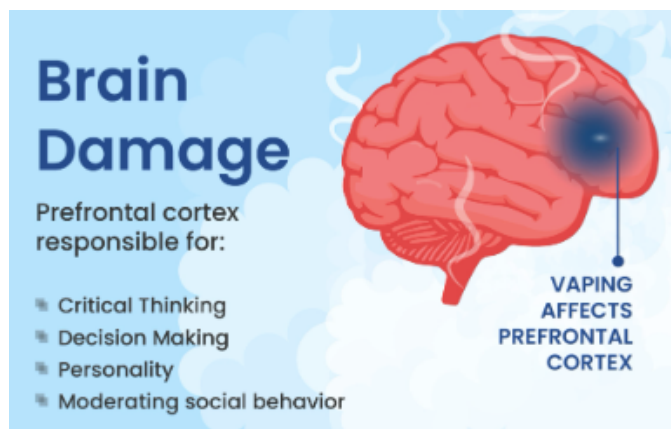
See the Figure below.



## 🏆 THE REWARD PATHWAY 🏆



When repeatedly smoked, nicotine “hijacks” and takes control of the brain’s reward pathway so you no longer have control over it. Nicotine (red dots) mimics the structure of Acetylcholine and readily binds to wherever there are acetylcholine receptors in the brain. This is the “hijack” process because nicotine blocks normal use of the brain’s natural chemical Acetylcholine, thereby “changing the brain” and making it susceptible to “addiction.”



### DID YOU KNOW?

In prefrontal networks, nicotine activates and desensitizes parts of your brain that affect cognition. The adolescent brain is sensitive to the effects of nicotine - studies show smoking during adolescence increases the risk of developing psychiatric disorders and cognitive impairment.