



## OVERVIEW

### BIG IDEA

Addiction to nicotine in cigarettes and tobacco products represents an ongoing public health dilemma

### OBJECTIVE

3.4 Analyze how public health policies and government regulations have influenced smoking

### AGENDA

1. Data Analysis
2. Reading & Research
3. Assessment
4. Homework: Experimental Analysis

### HOMEWORK

Read and analyze two experiments measuring blood nicotine concentrations for various sources of nicotine. Then answer the data analysis questions that follow.

# LESSON 3.4

## Tobacco

### SUMMARY:

This lesson will provide an opportunity for students to examine the current and past problem with tobacco facing our population. They will examine data, facts, and a timeline to connect factors that influence addiction to tobacco, including the physiological effects of nicotine and the effects of governmental regulations and laws. Students will begin by analyzing a graph showing smoking trends over time. They will then read about statistics on tobacco and the basics of the drug. After that they will go online to an informational site sponsored by the HHS to answer more questions and review a timeline of governmental laws and regulations regarding tobacco.



MODULE 3: DRUGS & ADDICTION LESSON 3.4

# Tobacco

Obj. 3.4: Analyze how public health policies and government regulations have influenced smoking

**DO NOW** Analyze the graph below to answer the questions that follow.

### Trends in Current Cigarette Smoking by High School Students\* and Adults\*\* — United States, 1965-2011

Year	Students (%)	Adults (%)
1965	-	43
1968	-	38
1971	-	37
1974	-	37
1977	-	35
1980	-	33
1983	-	32
1986	-	30
1989	-	28
1991	28	27
1994	34	26
1997	37	25
2001	34	24
2004	25	22
2007	20	21
2010	19	20
2011	19	15.9

\*Percentage of high school students who smoked cigarettes on 1 or more of the 30 days preceding the survey (Youth Risk Behavior Survey, 1991-2011).  
\*\*Percentage of adults who are current cigarette smokers (National Health Interview Survey, 1965-2011).

Source: [http://www.cdc.gov/tobacco/data\\_statistics/tables/trends/cig\\_smoking/index.htm](http://www.cdc.gov/tobacco/data_statistics/tables/trends/cig_smoking/index.htm)

1. Describe the trend in cigarette smoking by **adults** over time.
2. Describe the trend in cigarette smoking by **high school students** over time.
3. What factors do you think are responsible for these trends?

**DO NOW:** Ask students why the blue line only begins in the year 1991? (They can use logic or the footnote below). Ask students why the dotted gray lines correspond to. Ask students if they are surprised by any of the values or trends on this table. Point out that in 1965, when this data was first collected, nearly half of all American adults smoked!

**DO NOW: Answers:**

1. Over time, adult smoking has decreased significantly from approx. 43% in 1965 to approx. 19% in 2011.
2. Over time (from 1991-2011), student smoking sharply increased (until approx '96-'97) then sharply decreased.
3. Responsible factors are numerous, but may include: governmental regulation, anti-



DISCUSS

With a partner, share your ideas about factors that have influenced smoking rates over time.



Statistics on Tobacco Use:

- Each day, more than 3,600 people under 18 smoke their first cigarette, and more than 900 begin smoking on a daily basis.
- In 2011, an estimated 19 percent of U.S. adults were cigarette smokers.
- Approximately 18% of high school students smoke cigarettes.
- In 2011, nearly 18% of high school boys were current cigar users.
- From 2005 to 2011, the proportion of adult smokers declined from 20.9% to 19.0%.

Source: <http://betobaccofree.hhs.gov/about-tobacco/facts-figures/index.html>

Tobacco:

Tobacco is a leafy plant grown around the world. In 2007, four countries—China, Brazil, India, and the United States—produced two-thirds of the world’s tobacco. Tobacco is currently grown in 16 states in the United States. The largest tobacco-producing states are Kentucky and North Carolina. They account for 71% of all tobacco grown in the United States.

Dried tobacco leaves can be:

- Shredded and smoked in cigarettes, cigars, and pipes
- Ground into snuff, which is sniffed through the nose
- Cured and made into chewing tobacco
- Moistened, ground or shredded into dip, which is placed in the mouth between the lip and gum

Tobacco is an addictive substance because it contains the chemical nicotine. Like heroin or cocaine, nicotine changes the way your brain works and causes you to crave more and more nicotine. This addiction to nicotine is what makes it so difficult to quit smoking and other tobacco.

Source: <http://betobaccofree.hhs.gov/about-tobacco/tobacco-and-nicotine/index.html>



READ

Go to the website listed below. Review the information on the website, then navigate to the pages listed in each question cluster to find the essential information to answer the questions in your own words.

[betobaccofree.hhs.gov](http://betobaccofree.hhs.gov)

(Note: do not use the www. prefix)

READ: Statistics on Tobacco Use

Consult other websites for additional facts. One source for youth-specific information is the CDC’s site fact sheets for youth and tobacco use, found here: [http://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/youth\\_data/tobacco\\_use/index.htm](http://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm)

READ: Tobacco

For more information on a brief history of tobacco, check out the CNN site here: <http://edition.cnn.com/US/9705/tobacco/history/>

READ:

Students can work in partners or small groups, or at individual computers or tablets.



Use the website [betobaccofree.hhs.gov](http://betobaccofree.hhs.gov) to answer the questions below:

**Health Effects: Nicotine Addiction and Your Health**

1. Why is nicotine addictive?

**Health Effects: Effects of Smoking on Your Health**

2. How does smoking affect the heart and blood vessels?
3. How does smoking affect the lungs and breathing?
4. Do cigarettes cause cancer?

**Laws & Regulation: About Tobacco Laws & Regulation**

5. Why is tobacco control important?

**Laws & Regulation: Highlights of Federal Tobacco Control Efforts (timeline)**

6. In what year was the Federal Cigarette Labeling and Advertising Act passed and what did it require?
7. In what year was the Family Smoking Prevention and Tobacco Control Act passed? Summarize the law.



Answer the questions below based on what you have learned about tobacco:

1. What causes people to become addicted to cigarettes and other tobacco products?
2. What are some factors that have influence the rates of smoking?

**THINK:** Group work will help prevent copying answers word-for-word from the screen, but may promote all students writing the same words (from one student). Encourage students to discuss each question with pencils DOWN, then be SILENT while writing their own short summarized answers. This habit is important to push students towards, but is often not their default approach so it needs to be modeled and monitored.



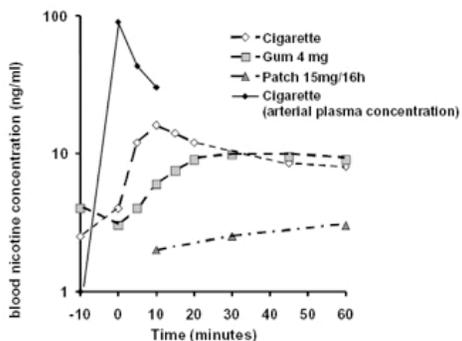
**HOMEWORK:** Use the experimental data below to answer the questions that follow.

Blood nicotine level is a measurement of the amount of nicotine circulating in the blood. The effect of the nicotine on the brain is almost instant, but within 20-30 minutes, the blood level of nicotine has dropped and your body begins signaling for more.

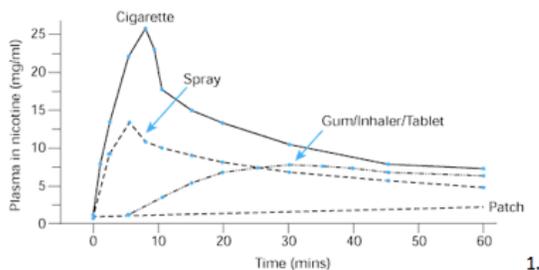
People become dependent on the nicotine in cigarettes because it increases the levels of certain chemicals, such as dopamine, in their brains. When a smoker wants to quit, one method doctors sometimes recommend is nicotine replacement therapy (NRT) which helps reduce nicotine withdrawal and craving by supplying your body with a smaller amount of nicotine.

A nicotine patch is worn continuously throughout the day. The nicotine in the patches is absorbed continuously through the skin and into the bloodstream. Nicotine gum releases nicotine through the lining of your mouth where it enters your bloodstream. The nicotine inhaler has a holder that contains nicotine. The inhaler delivers a puff of nicotine vapor into your mouth and throat. Nicotine nasal spray is sprayed in the nostrils and releases nicotine into the bloodstream very quickly.

**Experiment 1:** Scientist 1 measured the blood nicotine level of different nicotine-containing substances at various times. The data collected is shown in Figure 1:



**Experiment 2:** Scientist 2 also measured the blood nicotine level of different nicotine-containing substances at various times. The data collected is shown in Figure 2:



**HOMEWORK:**

The purpose of this homework assignment is for practicing experimental design and data analysis skills in the context of the drug being studied.

**HOMEWORK:**

**Answers:**

1. What was the purpose of these experiments? To determine the blood nicotine level of different nicotine-containing substances at various times
2. Figure 1 shows that as time goes on, the blood nicotine concentration for the patch: increase slightly; Figure 2: increase slightly



**HOMEWORK:** Answer the questions below based on the summary of the two experiments.

1. What was the purpose of these experiments?
  
2. Figure 1 shows that as time goes on, the blood nicotine concentration for the patch:  
Figure 2 shows that as time goes on, the blood nicotine concentration for the patch:
  
3. Figure 1 shows that as time goes on, the blood nicotine concentration for the gum:  
Figure 2 shows that as time goes on, the blood nicotine concentration for the gum:
  
4. According to Figure 1, at what time(s) do the gum and cigarettes produce the same level of blood nicotine concentration?
  
5. According to Figure 2, at what time(s) do the gum/inhaler/tablet and spray produce the same level of blood nicotine concentration?
  
7. If the experiments were repeated, which mistake would cause the data to be unreliable?
  - a. changing the order the substances were tested
  - b. not accurately monitoring the blood nicotine levels
  - c. changing the day the substances were tested
  - d. using repeated trials to determine the average values
  
9. Does the data in each experiment show the same relationship between time and blood nicotine concentration for each substance? Why or why not?

3. Figure 1 shows that as time goes on, the blood nicotine concentration for the gum: Increase sharply, then level out; Figure 2: Stay constant briefly, then rise gradually, level out and slightly drop in the end

4. According to Figure 1, at what time(s) do the gum and cigarettes produce the same level of blood nicotine concentration? Approx. 60 minutes after the start of use

5. According to Figure 2, at what time(s) do the gum/inhaler/tablet and spray produce the same level of blood nicotine concentration? Approx. 25 minutes after start of use? not accurately monitoring the blood nicotine levels

6. Does the data in each experiment show the same relationship between time and blood nicotine concentration for each substance? Why or why not? Yes, generally the same relationship.