Vaping and E-Cigarettes:
Are they Safe?

Brief Description

This lesson explores Electronic Cigarettes, one type of Electronic Nicotine Delivery System (ENDS). The media suggest e-cigarettes are a safer way to use nicotine than conventional cigarettes because there is no smoke or tar. This lesson will explore whether or not e-cigarettes are safe, what is known and not known about the chemicals they contain, similarities and differences between e-cigarettes and conventional cigarettes, and how ENDS are regulated.

Duration of the lesson: 90 min. or two 50-minute periods

Learning Objectives

- 2.3 Understands the concepts of prevention and control of disease
    - 2.3.2 Analyzes personal health practices, and how they affect non-communicable diseases
- 3.1 Understands how family, culture and environmental factors affect personal health
    - 3.1.2 Analyzes how environmental factors affect health
    - 3.1.3 Evaluates environmental risks associated with certain occupational, residential, and recreational choices.

Materials

- E-Cigarette Fact Sheet
- Question and Answer worksheet

Resources

Is Vaping Safer than Smoking? www.Youtube.com/riskbites

FDA, CDC, National Institute of Drug Abuse federal government and American Lung Association websites (urls on the next page)

Instructional Activities

Introduction and Information:

1. Hand out *Fast Facts about Electronic Cigarettes* factsheet to each student.
2. Students read and annotate the factsheet, writing the questions they have about E-Cigarettes on the Question and Answer worksheet.
3. In table groups, students brainstorm the questions they want to research.
4. Class shares out their questions. Teacher records the questions and organizes them by topic on the whiteboard.

Class activity:

1. Assign Questions to student pairs or table groups, choosing a range of topics from the factsheet.
2. Provide acceptable websites (.gov or .org) for research. A challenge to researching electronic cigarettes is avoiding commercial and "how-to" information. Here are some evidence-based sources of information:
    a. FDA: http://www.fda.gov/TobaccoProducts/default.htm
    b. CDC: http://www.cdc.gov/tobacco/stateandcommunity/pdfs/ends-key-facts.pdf
    c. CDC: E-Cigarette use among high school students: http://www.cdc.gov/pcd/issues/2016/15_0564.htm
    d. National Institute on Drug Abuse DrugFacts: https://www.drugabuse.gov/publications/drugfacts/electronic-cigarettes-e-cigarettes
    e. American Lung Association: http://www.lung.org/stop-smoking/smoking-facts/e-cigarettes-and-lung-health.html
3. Student groups share their research with the class. Classmates comment or ask further questions. Presenters try to answer these questions. New questions can be recorded for further research.

Exit ticket: Turn in Question and Answer worksheet

Center for ecogenetics & Environmental Health

Fast Facts about

Electronic Cigarettes

What are e-cigarettes?

Electronic cigarettes, also known as e-cigarettes or e-cigs, are battery-powered devices designed to look like and be used the same way as conventional cigarettes.

Unlike conventional cigarettes that burn tobacco and release nicotine into the smoke, e-cigarettes heat up a liquid that contains nicotine and release it as an aerosol. A cartridge in the e-cigarette dispenses the “e-liquid”. Another ingredient, propylene glycol, produces the aerosol, which is stored under pressure. When a button is pressed, the aerosol is released as a fine spray. Nicotine, nicotine-free, and flavored e-liquids are available.

E-cigarettes were invented in China in 2003. Sales have grown rapidly in spite of questions about safety, effectiveness to help smokers quit, impact on public health, and lack of regulation by the US government. The FDA began regulation e-cigarettes in Aug, 2016.

What is vaping?

Vaping means using e-cigarettes. Vaping copies the experience of smoking a cigarette by delivering vapor or aerosol to the lungs. The aerosol contains nicotine, propylene glycol, glycerin, and various compositions of flavorings.

Is vaping safe?

Since the US Food and Drug Administration (FDA) only began to regulate e-cigarettes in 2016, clinical studies for safety are not completed. Consumers have no way to know whether the devices are safe. The chemicals and their concentration in the e-liquid, and the dose of nicotine, were not regulated before 2016.

We do know that the amounts of nicotine, propylene glycol, and other ingredients in different brands of e-cigarettes vary widely. It is difficult to accurately measure the ingredients and by-products from heating the vaping solution. With FDA regulation, manufact-urers will have to state the ingredients and how much nicotine the e-liquid contains.

The air concentrations of nicotine from different brands of e-cigarettes have been found to be about 1/10th the concentration of secondhand nicotine from smoking cigarettes. However, using e-cigarettes indoors may expose others to nicotine. One study found that e-cigarettes produce second-hand exposure to nicotine but not to the toxins from burning that are produced by cigarettes.

Many Public Health officials agree that e-cigarettes are safer than smoking conventional cigarettes. However, research shows that smokers who switch to vaping do not tend to quit, or to give up nicotine.

Health effects of using nicotine include addiction, high blood pressure, and, later in life, coronary heart disease and cardiovascular problems. Inhaling propylene glycol and glycerol irritates the mouth and throat and causes a dry cough. These ingredients in the liquid solution will be studied for the health effects of inhaling the vapor into the lungs.

Also, nicotine can cause poisoning, especially for children. According to the World Health Organization, if a child swallows the e-liquid in a 24 mg e-cigarette cartridge, it would probably die. Nicotine is especially dangerous to youth, pregnant and nursing women, people with heart conditions, and the elderly. E-cigs may increase nicotine addiction among young people and lead them to try other tobacco products.

What about vaping hash oil?

Hash oil is concentrated *tetrahydrocannabinol* (THC), the psychoactive ingredient in marijuana. Hash oil is extracted from cannabis buds using liquid butane.

Vaping hash oil is another way to use marijuana. However, butane is extremely flammable and can explode. Buildings have caught fire and people have been burned when cannabis buds and butane blew up in their faces. School and public health officials are concerned about young people extracting hash oil and repurposing e-cigarettes to vape hash oil.

How are e-cigarettes regulated?

On Aug 8, 2016, FDA's regulatory authority began to cover all tobacco products, including vaporizers, vape pens, hookah pens, e-cigarettes, e-pipes, and all other Electronic Nicotine Delivery Systems (ENDS). FDA will regulate the manufacture, import, packaging, labeling, advertising, promotion, sale, and distribution of ENDS. This action is a milestone in consumer protection.

The FDA will now:

- Review new tobacco products not yet on the market
- Prevent misleading claims by manufacturers
- Evaluate the ingredients and how tobacco products are made
- Communicate potential risks of tobacco products

E-cigarettes and vaping solutions

Why is it important to regulate?

A goal of the FDA is to protect future generations from the risks of tobacco use. Laws that authorize the FDA to regulate tobacco products make these products less available and less attractive to youth. Every day, more than 2,600 kids try their first cigarette and nearly 600 kids become daily cigarette smokers. Many youth become addicted before they are old enough to understand the risks.

E-Cigarette Explosions

According to the FDA, 134 incidents of e-cigarette battery explosions and fires occurred in the US between 2009-Jan, 2016. The incidence is likely under-reported. Some explosions happen while the battery is charging. The lithium-ion batteries in e-cigarettes must be charged according to manufacturer instructions using the charger that comes with the e-cigarette. Plugging an e-cigarette into a standard USB port to recharge can result in an explosion or fire.

Do e-cigarettes help smokers quit or help non-smokers start?

The evidence does not suggest that smokers who switch to e-cigarettes stop using nicotine. The FDA has not approved e-cigarettes as smoking cessation aids.

E-cigarettes may hook new users on nicotine and encourage them to move on to smoking or chewing tobacco.

In 2015, over 3 million middle and high school students used e-cigarettes, up 22% from 2014. In 2014 and 2015, youth used e-cigarettes more than any other tobacco product. Youth said appealing flavors were the main reason they use e-cigs.

Questions to think about:

E-cigarettes were unregulated from 2003-2016. If the health effects of vaping were not known, do you think allowing e-cigarettes to be sold was the right thing to do?

Who besides the people who use e-cigarettes do you think might be exposed to the chemicals in the vapor? Do you think it is safe to expose non-users to e-cigarette vapor? Is it fair?

If using e-cigarettes is a gateway to smoking, but also helps smokers cut down, do you think e-cigarettes cause more harm than good, or vice versa?

The government is beginning to fund research to understand who is using e-cigarettes, and why. Use of e-cigarettes by young people is fairly low, but the number of young users has doubled every year. Why do you think young people are trying e-cigarettes?

Where can I learn more?

Federal Drug Administration (FDA):
http://www.fda.gov/TobaccoProducts/Labeling/ProductsIngredientsComponents/ucm456610.htm

Centers for Disease Control (CDC): E-cigarette Use Among Middle and High School Students
http://www.cdc.gov/tobacco/data_statistics/mmwrs/byyear/2013/mm6235a6/highlights.htm

Newspapers in Education: Marijuana and E-Cigs: Facts teens can use to make healthy choices
https://ad.seattletimes.com/FlippingBook/NIE/2016/DepartmentofHealth/

E-Cigarette Fires and Explosions. U.S. Fire Administration
https://www.usfa.fema.gov/downloads/pdf/publications/electronic_cigarettes.pdf

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E-Cigarettes
Question & Answer Worksheet

Read and annotate the *Fast Facts about Electronic Cigarettes* factsheet.

Write the 3 questions you have about electronic cigarettes:

1.

2.

3.

____

My Research Question:

My name:

Partner's name:

My research & notes (continue on back of page):

Sources: