Anticipation Guide

Name: _____

Directions: ***Before reading the article*****,** in the first column, write "A" or "D," indicating your **A**greement or **D**isagreement with each statement. Complete the activity in the box.

As you read, compare your opinions with information from the article. In the space under each statement, cite information from the article that supports or refutes your original ideas.

Me	Text	Statement
		1. As of publication date, more than 30 fatalities were linked to vaping in 2019.
		2. As of publication date, flavored e-cigarettes are illegal in all states.
		3. Smoking traditional cigarettes is the leading preventable cause of death in the United States.
		4. Nicotine e-cigarettes use tobacco for the nicotine.
		5. E-cigarettes produce aerosols (tiny droplets) that the user inhales.
		6. Alkaloids such as nicotine, caffeine, and fentanyl contain nitrogen.
		7. The conjugate base form of nicotine is readily absorbed by the lungs.
		8. Adding ammonium salts helps turn nicotine molecules into the conjugate base form.
		9. Flavor compounds in e-cigarettes may break down into formaldehyde.
		10. Nicotine is especially dangerous for teens because it induces a dopamine surge.

Student Reading Comprehension Questions

Name: _____

Directions: Use the article to answer the questions below.

1. Can you find all of the carbons in the THC structure on page 6? Verify that you found them all by comparing to the molecular formula.

2. How many bonds (indicate type) and how many lone pairs are on each nitrogen atom in the nicotine molecule?

3. Draw the complete Lewis structure for NH_3 and NH_4^+.

4. When vaping, the user inhales an aerosol, rather than a vapor. What makes something an aerosol?

5. Classify each of the following as gas, vapor, or aerosol
    a. Clouds in the sky
    b. The gasoline smell from a gas station
    c. Oxygen breathed in from the air
    d. Cigarette smoke
    e. Moisture in the atmosphere
    f. Helium inside a balloon

6. How many grams of formaldehyde would be inhaled during the consumption of Gummy Bear flavored liquid in a 30 mL bottle, if its density is 1.25 g/mL?

7. Why is THC not in the same class of compounds as nicotine?

8. Biochemistry is the study of the chemical structures and processes that occur in living organisms. Small changes in the structures of molecules, like enzymes, can cause changes in how they function in an organism, which can disrupt the system. What structural change do tobacco companies utilize to increase the percentage of nicotine that the lungs will absorb from their cigarettes?

Student Reading Comprehension Questions, cont.

9. Look at the two chemical equations in the "One Proton Difference" box. Assume the second reaction is in equilibrium. Justify, using equilibrium principles, why adding ammonia salts will favor the conjugate base form of nicotine.

10. The Juul product is made to have a smooth feel, leading the user to think the nicotine level is low and making it popular among teens. However, it was found that the Juul liquids contained more than five times the nicotine as other similar brands. The Juul liquid contained a lower percentage of the harsher, but better-absorbing, base form of nicotine, but a higher amount of total nicotine. Propose a scientific experiment (assuming non-human test subjects) that could be done to determine how much more nicotine is absorbed when in base form as opposed to acid form.

11. A friend of yours is considering taking up vaping and says that it is totally safe, because she plans on getting the nicotine-free kind. Refute your friend's claim using evidence from the article and reasoning to support it.

Questions for Further Learning

Write your answers on another piece of paper if needed.

1. Formaldehyde is a chemical typically used in embalming fluid. Research the effects formaldehyde has on a human body that makes it good for embalming.

2. One suggestion for helping reduce teen vaping is to pass a law that vaping liquids cannot have a pH less than 9. Explain why this proposal would likely help to reduce the numbers of teens who vape.

3. Watch a short video: https://www.youtube-nocookie.com/embed/ELKUljEaIHI
   Explain why vaping THC is even more dangerous than smoking it.

Graphic Organizer

Name: _____

Directions: As you read, complete the graphic organizer below to compare e-cigarettes and traditional cigarettes.

	E-cigarettes	**Traditional Cigarettes**
Chemicals in the cigarettes		
Chemicals produced during use of the cigarettes		
Effects on the brain		
Flavors		

Summary: On the back of this sheet, write a short letter to a friend who vapes describing what you learned about the harm e-cigarettes could be causing him/her.