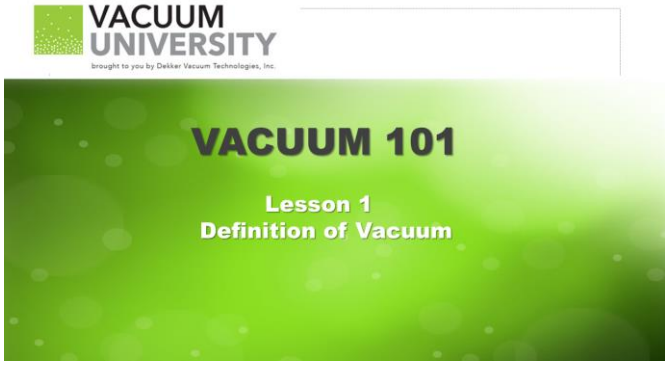
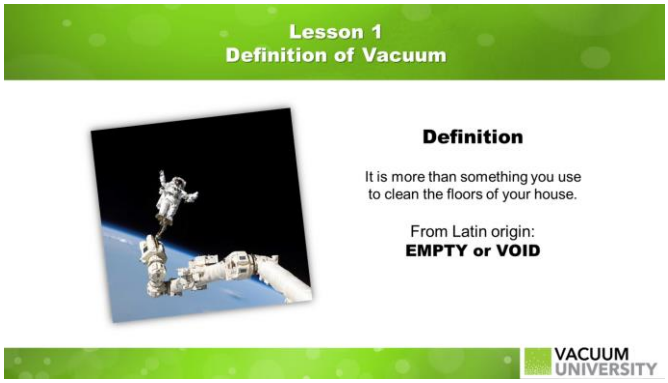
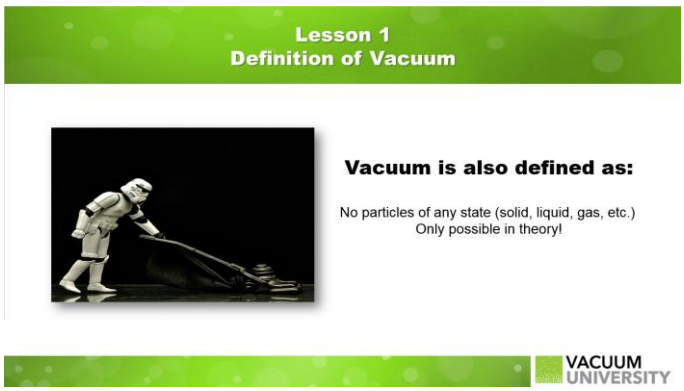
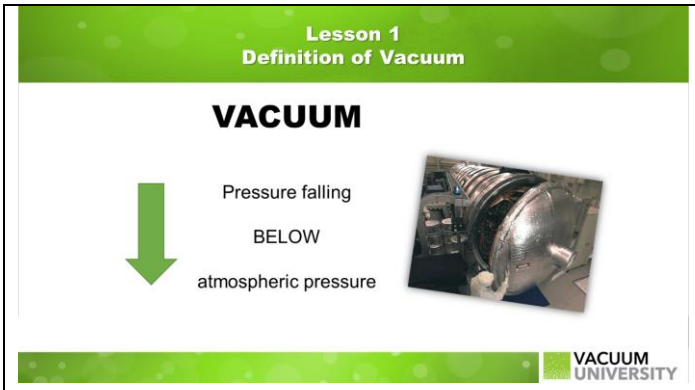
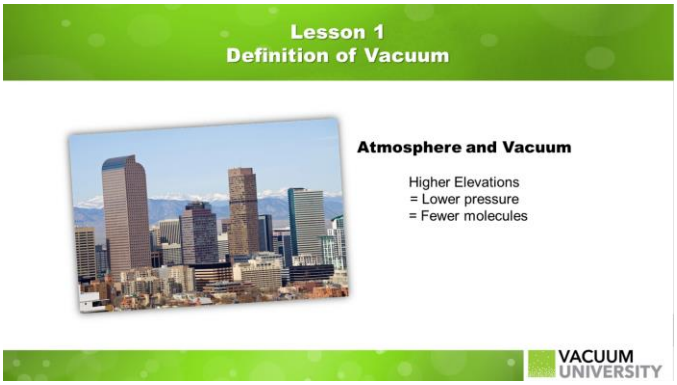
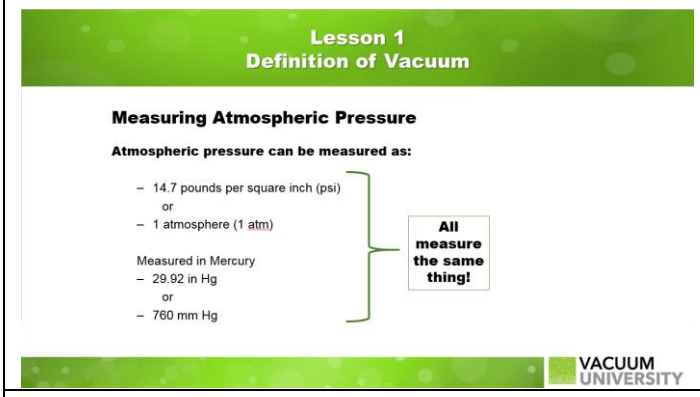
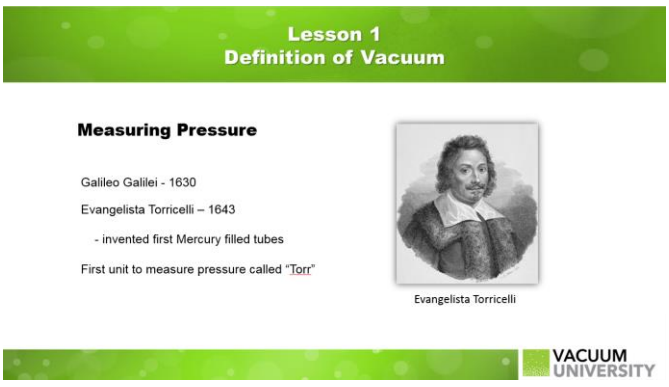
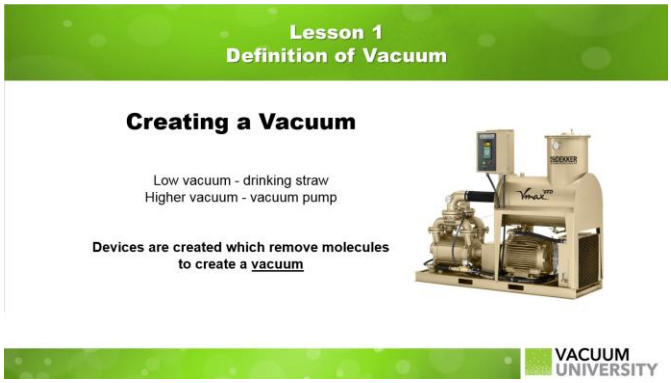
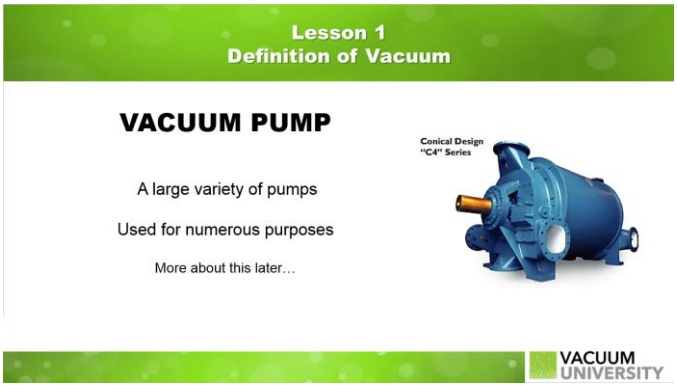
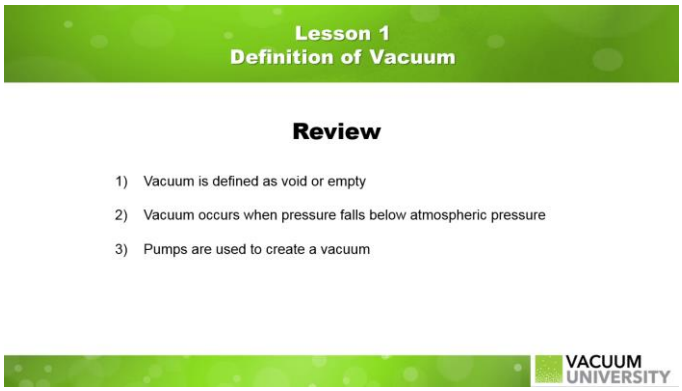
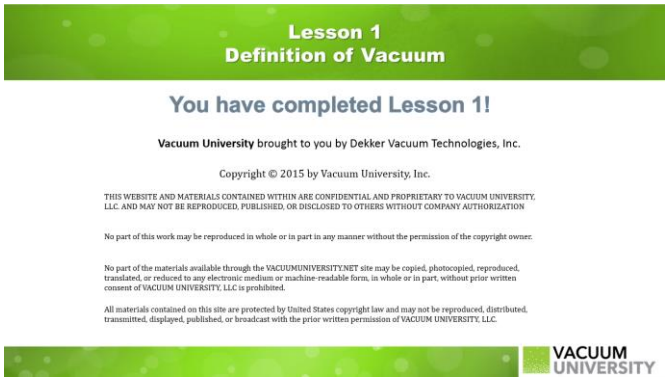
Vacuum University 101 SCRIPT
Lesson 1: Definition of Vacuum

Image	Voice Narration
	Hello. Welcome to Lesson 1 where you will be learning the basic definition of vacuum. Many of you have probably heard the term “vacuum”. And most likely, you associate it with household tools you use to clean out your car or clean the floors of your home.
	In this lesson, however, we are going to explore the concept of “vacuum” in a more technical sense of the word. In its Latin root origin, the meaning of “vacuum” is totally empty or a void. Let’s develop this definition some more and learn what it really means to us.
	Essentially, being in a “vacuum”, or in a perfect vacuum means that by definition there are NO particles of anything in any state, whether we are discussing a solid, a liquid or a gas. On earth, this state of a “perfect vacuum” is impossible to achieve. (Maybe out in deep space there exists a place where there are an extremely small number of particles floating around). Ultimately, to determine the level of “vacuum” that exists, we have to determine how many molecules are actually present in a certain volume that can be measured.

	Another way to define "vacuum" is anytime the pressure within a vessel falls below atmospheric pressure. Essentially, atmospheric pressure is the pressure that our atmosphere exerts on us. It is important to remember that atmospheric pressure differs at different elevations. Higher atmospheric pressure occurs when the air is denser [more molecules]. Fewer air molecules will result in a lower atmospheric pressure.
	For example: Did you ever notice that when you visit higher elevations (like Denver), it is more difficult to breathe? This is because the air is thinner at higher elevations and there are fewer molecules in the air. By definition, Atmospheric Pressure is the pressure exerted upon us as we stand at the surface of the earth, by the weight of the column of air above us that rises to about 140,000'. It is essential to measure this pressure as it is a key component to determining a state of vacuum.
	Atmospheric Pressure is measured in a number of ways. The most well-known is using the term of 14.7 pounds per square inch absolute or psia. Other measurements are equivalent to (1) Atmosphere, the pressure of a column of water equal to about 34', the pressure of a column of Mercury that stands 29.92" or 760 millimeters using metric units. They all measure the same thing - the *pressure* of this column of air above us.
	The basic understanding of "vacuum" and early devices for measuring vacuum has been around for over 400 years ago. Early in the 17th century (around 1630), Galileo Galilei had reported the creation of a partial vacuum formed by withdrawing a piston from a cylinder. But it was a man by the name of Torricelli who invented the first Mercury filled tubes called "manometers" in 1643. Hence, Torricelli's name shortened to "Torr" was used as the first measurement of pressure exerted by the weight of a column of Mercury. The weight in the column of mercury 1 mm tall became defined as "1 Torr" (Torr). This is essential for understanding how to measure vacuum and is a measurement and is still a term used today!

	Vacuum can be created in many different ways. An example of low vacuum in everyday life is when drinking with a straw. In order to achieve a greater or higher level of vacuum, a vacuum pump or device must be used to create a pressure below atmospheric pressure inside a closed vessel or piping system. The function of a vacuum pump or device is to remove molecules in order to create vacuum.
	A greater understanding of vacuum along with advances in technology has enabled us to artificially create vacuum using a large variety of pumps or other vacuum inducing devices for numerous purposes. More will be learned about this in the 102 level courses.
	So let's review our first lesson on Definition of Vacuum. The most basic definition of vacuum is something that's void or empty, and in more practical terms, any time that the pressure falls under atmospheric pressure. That way, you have fewer molecules colliding with each other, in other words, applying pressure upon you. Also, today we have many types of pumps that create vacuum for a variety of purposes.
	No voiceover…