

EXERCISE

INSTRUCTIONS: While you read this passage, **underline key ideas or terms. Put a box around unfamiliar terms. Draw a star if you find an idea you think is really important.** Make caveman notes—**2-4 words that summarize the big ideas** within a section. We did this with the same passage, so after you're done you can look over to see how our version compares to yours.



Legend has it that coffee was first discovered in Ethiopia when a goat herder ate some berries that seemed to make his goats surprisingly energetic. Sometime around 1000 AD, people in Arabia began to use the coffee bean to brew a drink. One thousand years later, coffee is not just a beverage—it is a worldwide cultural and economic institution. Picture the more than 21,000 Starbucks locations worldwide as evidence. Or consider the fact that coffee is the lead export of 12 different countries. Or simply consider this staggering fact: humans consume four hundred billion cups of coffee annually, making it the second most popular beverage in the world behind water.

The popularity of coffee has much to do with an alkaloid crystalline compound commonly known as caffeine. During the millennia that humans have consumed coffee and tea, the caffeine found in these plant-based beverages has been utilized to increase alertness in the morning or enhance productivity throughout the day. The eye-opening power of coffee is so well known that it's a cliché—mugs with cute sayings like “I don't start working until my coffee does,” and television characters who seem to spend at least half their lives inside of coffee shops attest to that. It's almost enough to make you think that coffee's appeal is limited to its caffeine content. The question arises: are coffee and caffeine inseparable?

The question can be answered on two levels: the hypothetical (do people really want coffee that does not deliver caffeine?) and the practical (is it possible to effectively remove caffeine from coffee?). It makes sense to answer the questions in order: if people don't want coffee without caffeine, why should we bother to try?

Is caffeine the sole reason for coffee's appeal? Some say that they crave coffee for

the smell or the taste. Others would say that those aspects are simply reminders of the caffeine content, a signal to the human brain to “get excited” about the energy boost to come. One factor to consider is that caffeine consumption has negative side effects such as anxiety and sleeplessness; these symptoms are so acute in some people that they cannot consume any caffeine at all. Other people simply do not desire the physical effects of caffeine. Anecdotally, some members of both of these groups still enjoy the ritual and taste of coffee. Though it's not a scientific result, we know that there are people who enjoy coffee but actively avoid caffeine.

The existence of this group who say “yes” to coffee but “no” to caffeine has led coffee producers to believe in the significant commercial potential of coffee without caffeine, which in turn has led to the science of decaffeination. Practically, decaffeinating a coffee bean is about as easy as unscrambling an egg. Caffeine molecules permeate the bean and are dispersed over the entirety of its contents. Not only that, but the flavor of coffee comes from more than 400 separate chemical compounds in the coffee bean. Taking the caffeine out of the bean without disturbing that delicate balance is nearly impossible. Yet, despite these logistical difficulties, modern science has managed to create a product: the “decaffeinated” coffee bean.

The most popular method of removing caffeine from the coffee bean relies on the use of a chemical solvent. Unroasted green coffee beans are steamed to force the caffeine in the beans to surface; then the caffeine is removed by washing the bean in the solvent. Methylene chloride is the chemical solvent most used in decaffeination and, even though it has been found to be toxic in high doses, the amount found in an average cup of coffee

NOTES:

is well within the limits that the US Food and Drug Administration deems acceptable.

Recently, however, science has come up with a less toxic method. Known as the Swiss Water Process (despite the fact that the only factory that uses this process is located in Canada), it involves soaking coffee beans in water saturated with the flavor compounds in coffee. When a batch of new beans is soaked in this compound, the caffeine is free to leave the beans, but the saturation of flavor in the water prevents the beans from also giving off their delectable, non-caffeinated compounds.

Hope for an easier way to brew “decaf” arose in 2004 when scientists discovered a strain of coffee plant in Ethiopia that produces caffeine-free beans. The strain is not hardy enough to stand up to the rigors of commercial production, so it will have to be crossbred with a commercial variety before it is ready for market. The energy dedicated to taking the caffeine out of coffee attests to the popularity of the ritual born so many years ago, when some goats enjoyed the first ever “coffee buzz.”