



BRAIN POWER NEWS

Parent Newsletter

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The Science Behind Smoking

Most adults have known for years about the dangers of smoking. Nonetheless, smoking is still portrayed in the media as something glamorous and sophisticated, and many young people are still starting to smoke. While the number of adult smokers in the U.S. has declined, cigarette smoking among youth remains at unacceptably high levels. In fact, those teenagers who smoke typically start at age 14 and become daily smokers by age 18.

Clearly, there is a strong need to keep adolescents from starting to smoke. Module 5 of the *Brain Power!* program addresses this issue by having students perform an experiment that illustrates the unhealthy residue that tobacco leaves behind. Students begin with three cups of water. They put a cigarette in one cup, a leaf in a second cup, and nothing in the third cup. The third cup serves as a control against which to compare changes in the other two cups. Students will observe that the water with the cigarette turns yellow, mimicking what happens inside the lungs after smoking.

Students also discuss nicotine, the highly addictive drug found in the leaves of the tobacco plant. The nicotine molecule is shaped like the neurotransmitter acetylcholine (remember from module 3 that neurotransmitters are chemicals in the brain that carry messages), which is involved in functions such as muscle movement, breathing, heart rate, and learning. Acetylcholine also causes the release of other neurotransmitters and hormones that affect mood, appetite, and memory. When nicotine gets into the brain, it attaches to acetylcholine receptors and takes over their actions. Nicotine is addictive; it changes the way the brain works so that the brain and body don't feel normal without it.

Nicotine also stimulates areas of the brain that are involved in producing feelings of pleasure and reward by raising the levels of another neurotransmitter, dopamine. Increased levels of dopamine produce the strong, pleasurable feelings that lead to

continued

addiction. Because nicotine is so addictive, once people start smoking, it is hard for them to quit. When smokers do try to stop, they often experience craving for cigarettes, anger and frustration, irritability, restlessness, difficulty sleeping, difficulty concentrating, hunger and weight gain, anxiety, fatigue, and depression.

We encourage you to ask your child about this learning experience. What were his or her reactions to the results of the experiment? Was your child surprised by the results? Did the experiments raise questions for your child? Our hope is that the experiment will lead to lively discussion that will reinforce the message that smoking is not healthy.



Science at Home

Discuss choices about smoking made by family members. Do you or does anyone in your extended family smoke? If so, would that person be willing to discuss with your child when he or she started, whether he or she has tried to stop? If the smoker is older, discuss whether the scientific information about smoking was available when he or she started smoking. If not, ask about his or her reaction to the news when it first appeared in the 1960s. Social influences on smoking (for example, parent, sibling, peer, neighborhood, and school influences) have an enormous impact on adolescent smoking. By discussing these issues with your child now, while he or she is still young, you are preparing him or her to make wise decisions in the future.



What Does Your Child Think?

Have your child draw or write something about tobacco or nicotine.

Additional Resources

The books and Web sites listed below have more information about tobacco and nicotine.

National Institute on Drug Abuse (NIDA)
www.drugabuse.gov, 301-443-1124

This Web site contains information about drug abuse and a section designed specifically for parents, teachers, and students.

National Institute on Drug Abuse (NIDA)—Mind Over Matter
www.nida.nih.gov/MOM/MOMindex.html

This educational series, developed by NIDA, includes a section that focuses specifically on nicotine and its effects.

National Clearinghouse for Alcohol and Drug Information (NCADI)
www.health.org, 1-800-729-6686

NCADI is the world's largest resource for information and materials concerning substance abuse. Many free publications are available here.

Friedman, D. *Focus on Drugs and the Brain*. Frederick, MD: Twenty-First Century Books, 1990. Part of the "Drug-Alert Book" series; includes a section on nicotine and addiction.

Lynch, B. S. *Growing Up Tobacco Free: Preventing Nicotine Addiction in Children and Youths*. Washington, DC: National Academy Press, 1994. Addresses tobacco prevention programs for youth, the effect of tobacco advertising, controls and bans on tobacco sales, and taxation as a prevention strategy; also explains nicotine's effects on the brain and body and the process of addiction.

Neuroscience for Kids

<http://faculty.washington.edu/chudler/neurok.html>

This site includes a section on the history of tobacco, cigarette smoking, nicotine addiction, and the effect of nicotine on the brain.

Smoke-Free Kids and Soccer

www.cdc.gov/tobacco/sports_initiatives_splash.htm

An innovative collaboration between the U.S. Department of Health and Human Services and the U.S. Women's National Soccer Team; includes information on smoking, links to free stuff, and ideas on how to get children involved in activities other than smoking.