

Lesson 4: Drug Use and Abuse

Rachel drinks coffee. Jiao drinks colas. Davis drinks beer. Basem smokes cigarettes. Lyndsey occasionally smokes marijuana. Jarod is a bodybuilder and injects steroids. What do these individuals have in common? If you said that each person is using a drug, you would be correct.

Did you notice that each of these people is using drugs for non-medical reasons? For example, most are using their particular drug for recreational reasons.

Did you notice that these people are using different methods of taking the drugs? For example, Rachel drinks the coffee. Basem inhales the cigarette. Jarod injects the steroid.



Did you notice that some of the drugs are legal; some are controlled drugs, and others are illegal drugs? For example, coffee and cola are legal. Alcohol and tobacco are controlled substances; adults can buy them legally but minors cannot. Marijuana and steroids are illegal.

What does this tell you about drugs? Drugs include a wide variety of substances. Basically, a drug is any substance that changes a person physically or psychologically.

Some people intentionally abuse drugs. As you discovered in earlier lessons, some people abuse diuretics, laxatives, and appetite suppressants in an effort to lose weight. Others abuse anabolic steroids in order to gain muscle mass. Furthermore, some drug users develop an **addiction**. They feel compelled to use the substance and have difficulty quitting. They develop withdrawal symptoms when they stop using.

In this lesson you will examine the effects of the use and abuse of drugs including tobacco and alcohol on your health.

addiction:
the need for something that is physically or psychologically habit-forming

Addictions are characterized by withdrawal symptoms.

Tobacco

Despite all the education about the hazards of smoking, many Canadians still smoke cigarettes, cigars, or pipe tobacco. Some Canadians—especially in western Canada—use smokeless tobacco, such as spit tobacco.



You may be surprised to discover that the number of teenagers in Alberta who smoke increased by 30 per cent between 2004 and 2005. Most of these smokers are female.



1. With a partner or small group brainstorm some of the reasons why some teenagers begin smoking. Also consider the reasons why more smokers don't quit.

Compare your answers with the Suggested Responses at the end of the lesson.

Harsh Reality Ugly Truths About a Nasty Habit

You're almost an adult. You expect to be treated with respect and to be seen as independent, in control, and capable of making your own decisions. Hello? What are you doing with that butt in your hand? The numbers are gruesome; the reality is not pretty. To start smoking these days when the vicious effects of tobacco are common knowledge, is,

well, dumb. To take major risks with your health and that of others is not bright. There's a lot of discussion going on about what's true or not as far as how smoking affects you. To help you sort out the reality from the propaganda, *Ingénue* presents some ugly truths about a nasty habit.

Exactly how many vacations, cars, clothes, and tuitions does that add up to?

Annual sales of cigarettes to young Canadians, aged 10 to 19, tops the \$400 million mark.

Old Prune Face

Nicotine constricts the blood vessels that bring oxygen to the skin. Without the proper amount of oxygen, skin ages and shows it much faster.

Scent of a Woman

Out of the 10 guys we surveyed, all of them said that kissing a girl who smelled like an ashtray was a real turnoff, and could cause them to reconsider pursuing a relationship.

They call her mellow yellow

Smokers develop yellow teeth and nicotine stained fingers. Now that's attractive.

Does Jenny Craig know this?

Eating right and exercising are healthy ways to control weight. Smoking is not. Think how much weight you could gain when you are unable to even climb a flight of stairs or do a basic work-out, because you can't catch your breath.

The price of puffing

Smoking alone is responsible for \$6-15 billion each year in associated health costs.

I was thinking of joining a monastery anyway

Non-smokers are the majority. Two-thirds of Canadians over the age of 15 do not light up. Government restrictions for designated smoking areas make it an antisocial, isolating habit.

Shake, rattle and roll

The relaxing effects of tobacco are an illusion. Its use eventually makes you more jittery. A step class or an afternoon spent rollerblading will do more to calm you than taking a drag ever could. Looking for a quick fix? Opt for a sip from an Evian bottle.

You can fool your mind, but not your body

Nicotine belongs to the same family of drugs as amphetamines and cocaine. It is classified as highly addictive by the medical profession.

Relax, I always practice safe smoking

There is not such thing as a "safe" cigarette. The low-tar varieties often produce higher levels of chemicals (such as carbon monoxide) than do their high-yield counterparts. Low-tar smokers also tend to smoke more frequently and inhale more deeply.

Still Crazy for tobacco?

Lung cancer is overtaking breast cancer as the leading cause of cancer death for women. Moreover, there are solid links between smoking and cervical cancer, menstrual disorders, early menopause, osteoporosis, and risks to pregnancy and fetal health.

2. Which *ugly truth* about smoking did you find most persuasive?

Compare your answer with the Suggested Responses at the end of the lesson.

¹ "Harsh Reality: Ugly Truths About a Nasty Habit" ("Ingenu Magazine"), taken from Healthy and Well (Lifechoices Series). Campbell, Judith (Pearson Education Canada, 1996), 34. Reproduced with permission by Pearson Canada.



For more information about smoking, go to the following website:

http://tobacco.aadac.com/87_223.asp/

If you are a smoker and need help quitting, you may want to contact a quit-smoking program or service in your community. If you don't know where to go for help, try the Smokers' Help Line (1-866-33-AADAC); it's a great place to seek help and advice about how you can quit smoking successfully.



You will also find information on how to quit smoking at the following website:

<http://alberta.quitnet.com/>

Second-Hand Smoke

Smoking isn't only a danger to smokers. Non-smokers who are exposed to second-hand smoke absorb nicotine and other compounds just as smokers do. Although the smoke to which a non-smoker is exposed is less concentrated than that inhaled by smokers, research indicates there are significant health risks associated with second-hand smoke.

Separating smokers and non-smokers within the same air space may reduce—but does not eliminate—a non-smoker's exposure to second-hand smoke. That is why more and more enclosed public places such as restaurants are becoming entirely smoke-free. Some cities and towns have actually instituted smoking by-laws in order to make it illegal for people to smoke in public places. Having smoke-free facilities is a way of controlling the amount of smoke in your life, thus reducing your health risks.



3. With a partner or small group discuss the following questions:

- Are municipal governments going too far by limiting people's rights to smoke in public places?
- Do all people have a right to work or spend time in smoke-free environments?

Compare your answers with the Suggested Responses at the end of the lesson.

Use of Tobacco in Aboriginal Cultures



Smoking rates for First Nations and Inuit communities are more than double the rate for the rest of Canada. This poses significant health risks for individuals and for communities.

At the same time First Nations people have used tobacco in ceremonies for thousands of years. Therefore, tobacco has special meaning for First Nations people.

Traditional and Non-traditional Use of Tobacco

First Nations people

For many First Nations people, tobacco has been used traditionally in ceremonies, rituals, and prayer for thousands of years. It is used for a variety of medicinal purposes and its ceremonial use has powerful spiritual meaning establishing a direct communication link between the person giving and the spiritual world receiving. In the traditional sense, the most powerful way of communicating with the spirits is to smoke tobacco in a sacred pipe.

While tobacco is sacred, the recreational use of tobacco with its high content of nicotine, is addictive and harmful. First Nations Elders maintain that this type of use is disrespectful of the spiritual, medicinal, and traditional use of tobacco.

The recreational use (or misuse) of tobacco is any use of tobacco in a non-traditional way. For example, smoking cigarettes, chewing tobacco or snuff, smoking non-traditional tobacco in non-sacred pipes or smoking cigars. There is an important distinction between the traditional and non-traditional use of tobacco as one is respectful of First Nations customs, the other being dangerous and harmful.

Traditional tobacco has been used by many First Nations people to

- Pray.
- Give thanks to the Creator and Mother Earth.
- Communicate with the spirits.
- Purify the mind and heal the body.

Inuit

Inuit do not practise the traditional or ceremonial use of tobacco.

Facts on Smoking Rates

The First Nations and Inuit Health Branch of Health Canada reports the following facts on smoking rates in First Nations and Inuit communities:

- Sixty percent of on-reserve First Nations people between the ages of 18 and 34 currently smoke.
- Seventy percent of Inuit in the north between the ages of 18 and 45 currently smoke.
- Almost half of Inuit (46%) who smoke started smoking at age 14 or younger.
- The majority of on-reserve First Nations people who smoke (52%) started smoking between the ages of 13 and 16.

4. What is the distinction between traditional use of tobacco and smoking tobacco for recreational purposes?

Compare your answer with the Suggested Responses at the end of the lesson.

Did You Know?

Weedless Wednesday is part of National Non-Smoking Week (NNSW), which is observed in the third week in January. Weedless Wednesday focuses on the benefits of quitting smoking and promotes the community resources available to help smokers quit.

¹ "Tobacco," <http://www.hc-sc.gc.ca/fnih-spni/substan/tobac-tabac/index_e.html> (13 September 2007). Reproduced by permission of Health Canada.

Smokeless Tobacco

Smokeless tobacco was very popular in the late 19th and early 20th century. In fact, spittoons and cuspidors were a common feature in many homes and public places. Evidence shows that smokeless tobacco has become popular again, especially in western Canada. Athletes, Aboriginals, and rural males are the groups who use smokeless tobacco the most.



Ashley: What is smokeless tobacco?

Ms. Chan: You may have heard of it as spit tobacco. It's also known as *chew*, *snuff*, or *plug*. Regardless of the name, it's still a type of tobacco. Users place a small amount of tobacco inside their mouths. This is usually left in place for about 30 minutes. Saliva mixes with the tobacco and produces brownish tobacco juice that is either swallowed or spit out. Nicotine and other chemicals are released into the bloodstream through the mucous membranes in the mouth.

Mr. Romanchuk: Spit tobacco is a mixture of tobacco, sweeteners, abrasives, salts and chemicals. In fact, it contains over 3000 chemicals, 28 of them are known to cause cancer. Some of the chemicals include formaldehyde (used in embalming fluid), arsenic (rat poison), nickel cadmium (used in car batteries), and polonium 210 (part of nuclear waste).

Ashley: Wow! That sounds pretty toxic. Is it addictive?

Ms. Chan: Yes, it is. Spit tobacco is addictive because it contains nicotine, which is an addictive substance. Spit tobacco actually contains more nicotine than cigarettes do. One pinch of spit tobacco has the same amount of nicotine as 3 to 4 cigarettes. Read the following to learn more about spit tobacco and the consequences of using it.

Spit Tobacco

Some kids believe that spit tobacco (chew, snuff, dip) is safe. This is a lie. The dirty truth is that spit tobacco contains more nicotine than cigarettes do. It also contains over 3,000 chemicals, including 28 known cancer-causing chemicals (carcinogens). Formaldehyde (preservative of body tissues), acetaldehyde, arsenic (rat poison), nickel, cadmium and benzopyrene. They're all there and more.

Some athletes use spit tobacco because they think it boosts performance. This is not true. Studies show no improvement. Nicotine constricts the blood vessels, slowing reaction time and causing dizziness—a disadvantage if you're playing sports or working in a dangerous environment.

Spit tobacco does a lot of damage to the inside of your mouth. Listen to this: leukoplakia (white leathery patches that can develop into cancer), worn teeth, cavities, lost teeth, yellowing of teeth, receding gums, gum disease and bad breath.

Worse yet, spit tobacco causes cancer of the mouth, throat, and voice box. The earlier you start, the longer you chew, the more risk you have for cancer. On average, half of all oral cancer victims die within five years.

Quick Facts

- The amount of nicotine absorbed through spit tobacco is two to three times more than with a cigarette.
- If you dribble spit tobacco on your clothes, you'll never get the stain out.
- Spit tobacco causes white mouth sores in 40% to 50% of users. These sores can become cancerous.
- Spit tobacco yellows, scratches, and wears your teeth, gives you cavities, eats away at your gums, and gives you bad breath.
- Spit tobacco causes cancer of the mouth, throat, and voice box.
- About half of all oral cancer victims die within five years.
- The spit tobacco rate among Alberta teenagers is more than double the national average.

5. Luke thinks using spit tobacco is safer than smoking cigarettes. Give Luke some facts to dispute his opinion.

Compare your answer with the Suggested Response at the end of the lesson.

¹ "Spit Tobacco," April 2007, <http://www.aadac.com/124_712.asp> (16 May 2007). Reproduced by permission of Alberta Alcohol and Drug Abuse Commission, an Agency of the Alberta Government.

Alcohol



Do you know that 80% of Canadians over the age of 15 have drunk alcoholic beverages at some time in their lives—at a party, concert, sports event, or meal?

Do you know that people who begin drinking before age 15 are four times more likely to develop alcohol dependence than those who begin drinking at age 21?

Do you know that impaired driving is the largest single criminal cause of death and injury in Canada?

If you are of legal drinking age, choosing to drink is a personal choice. Knowing the effect of alcohol on your body may help you make responsible decisions about alcohol.

Alcohol

Beer commercials sure make it seem like drinking is the key to fun. If only life were like commercials. It's actually hard to know how people will act after drinking alcohol. A lot depends on the drinker's mood and where they are drinking. After a couple of drinks, one person might be more relaxed, another depressed, another more wild, another angry. In general, you'll feel more of what you were feeling before you started drinking. People who are depressed can feel even worse. Sometimes, you will feel whatever you expect the alcohol to make you feel.

What is alcohol?

The alcohol in beer, wine, shots,

and other drinks is a liquid made by fermenting or distilling grains, fruit, or even some kinds of vegetables. The chemical name for alcohol is ethyl alcohol or ethanol. In beverages, pure alcohol is diluted with other ingredients.

Alcohol enters the bloodstream through the stomach and intestine. Once in the bloodstream, it is carried to other parts of the body quite quickly. In fact, it reaches the brain almost immediately. Judgment, inhibitions, reaction time, coordination, vision, speech, balance, walking, and standing are all affected by alcohol. Alcohol stays in the body until it is metabolized (broken down) by the liver and eventually leaves the body through breath, sweat, and urine.

blood alcohol concentration (BAC): the percentage of alcohol in the blood. A BAC of .08 means that the blood alcohol concentration is in excess of 80 milligrams of alcohol per 100 millilitres of blood.

fetal alcohol spectrum disorder (FASD): a term used to describe several permanent, and often devastating birth-defect syndromes caused by a pregnant woman's use of alcohol; also called alcohol-related birth injury (ARBI)

How much is one standard drink?

A drink is a drink is a drink. A bottle of beer (341 ml or 12 oz.) has the same amount of alcohol as a glass of wine (142 ml or 5 oz.) or a glass of whisky (43 ml or 1.5 oz.).

Is alcohol found in things other than beer, wine, and liquor?

Yes, but this form of alcohol is not meant for drinking. Methyl alcohol is found in rubbing alcohol, Lysol, vanilla extract, some mouthwashes, aftershave lotions, and cooking wine. This type of alcohol is a poison and should never be swallowed!

What does alcohol do exactly?

Alcohol is a downer. It might seem like alcohol makes people more relaxed, outgoing, and active, but these traits show up because alcohol is reducing the activity of the brain. Anything that lowers brain activity is a downer. This explains why alcohol slows reaction time and leads to poor judgment.

If people drink faster than their bodies can get rid of the alcohol, the alcohol builds up in their blood. To figure out how drunk a person is, you measure the alcohol in their blood. The exact level is called the **blood alcohol concentration** or **BAC**.

Your first drink starts your BAC on its way up. By .12 BAC you may be nauseous and vomiting. At .15 you are walking and talking funny. At .30 you might pass out and at .40 you can even die. But it doesn't matter, because you were arrested and thrown in jail for impaired driving way back at .08.

The Breathalyzer

Police use a Breathalyzer to measure the amount of alcohol in your breath and use that to tell how much you've drunk. Breath mints will make your breath a little easier to stand but they won't fool the Breathalyzer.

Dark side of Drinking

Over the long-term, heavy drinking damages the liver, heart, and brain; and can lead to loss of appetite, vitamin deficiencies, stomach ailments, skin problems, weight gain, sexual problems, and memory loss.

Why can't teens drink if their parents can?

Teens' bodies are still developing and alcohol has a greater impact on their physical and mental well-being. For example, people who begin drinking before age 15 are four times more likely to develop alcoholism than those who begin at age 21.

What happens when pregnant women drink?

Alcohol damages a developing baby's brain and body. This can result in **fetal alcohol spectrum disorder (FASD)**, a term used to describe the different conditions that affect children whose mothers drank while pregnant. FASD includes disabilities that affect how a baby looks, thinks, acts, and learns. These disabilities are life-long. Nobody knows what a safe level of drinking is, but it is known that the more alcohol consumed, the greater the risk of damage.

What To Do

Before you take a drink:

Know the law. One drink can make you fail a breath test. If you are found to have any amount of alcohol in your system while driving a vehicle, you will lose your driver's license for 6 months or more and be subject to a fine of at least \$600. A second offense can land you 14 days in jail.



Know the risks. Mixing alcohol with medications or illegal drugs is extremely dangerous and can lead to accidental death. Remember street drugs (illegal drugs) are sometimes mixed with other substances, so you may not know what you are buying. If you don't know what you're buying, you can't be sure what will happen when you mix these street drugs with alcohol. Tranquilizers and antihistamines are two types of legal drugs known to be dangerous—and in some cases fatal—when taken with alcohol.

Keep your edge. Alcohol can make you gain weight and give you bad breath. Look around you. A lot of people don't drink. Ask them why and see if they can give you advice on how to avoid or cope with stressful situations without turning

to alcohol.

Learn to say no. It's not as hard to refuse as you might think. Try: "No thanks," "I don't drink," or "I'm not interested."

After that first drink:

Know the signs. How can you tell if you or a friend has a drinking problem? Sometimes it's tough to tell. But there are signs you can look for. If you or a friend has one or more of the following warning signs, you or they might have a problem with alcohol:

- problems remembering things they recently said or did
- getting drunk on a regular basis
- lying about how much alcohol he or she is using
- believing that alcohol is necessary to have fun
- having frequent hangovers
- feeling run-down, depressed, or even suicidal
- having "blackouts"—forgetting what he or she did while drinking
- having problems at school or getting in trouble with the law

The true test of dependence and addiction is how you feel when you quit. If you're not sure whether your drinking is serious enough to be called alcoholism, try going a week without a single drink. If you fail—get help.

¹ Aboriginal Youth Network <http://www.ayn.ca/health/addictionsalcohol.aspx>



6. What is the definition of impaired driving? What are the risks and consequences of drinking and driving?
7. What is fetal alcohol spectrum disorder? How can it be prevented?
8. With a partner or small group discuss whether the following statements are true or false.

- A. Mixing beer and hard liquor with soda or juice gets a person drunk faster.
- B. A person can drink a lot more “light beer” than regular beer before getting drunk.
- C. Beer will not get a person as drunk as hard liquor will.
- D. Drinking on an empty stomach makes a person more drunk.
- E. Smaller people get drunk more easily.
- F. Alcohol peps a person up.
- G. Athletes can drink more without getting drunk.
- H. If a person can walk steadily, that person is not drunk.
- I. Alcohol cures a cold.
- J. Hot coffee, cold showers, or exercising will help sober a person up more quickly.

Compare your answers with the Suggested Responses at the end of the lesson.

Where To Go for Help

Do you have a problem with alcohol, or do you know someone who does? If so, you can seek help from any of the many services, support groups, agencies, and resources available in your community.

The Alberta Alcohol and Drug Abuse Commission (AADAC) offers a variety of programs and services for adults and youths. Alcoholics Anonymous is another important organization that supports individuals in their fight against alcoholism. Affiliate organizations Al-Anon and Alateen support friends and family members whose lives have been affected by someone else’s drinking.

¹ Weigl Educational Publishers Limited.

Other Drugs



Has your doctor ever prescribed an antibiotic or some other type of drug to make you well or to manage a medical condition such as asthma or diabetes? Have you ever taken a headache tablet or cough syrup?

over-the-counter drug (OTC): a drug that does not need a doctor's prescription and can be purchased over the counter at pharmacies or grocery stores

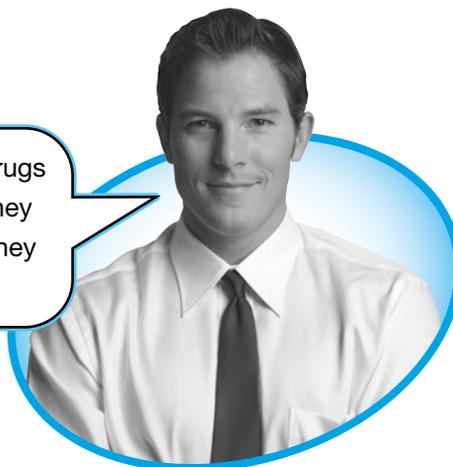
The medicinal use of drugs benefits many people. However, many Canadians are careless when it comes to using drugs—especially **over-the-counter drugs (OTC)**. An Ipsos Reid survey on over-the-counter drugs, released in January 2006, found that as many as 10 million Canadians ignore the directions on the labels. The survey also reported that 37% of Canadians routinely abuse over-the-counter drugs by taking more medicine than is recommended, taking the next dose sooner than suggested, and taking medicine in combination with other drugs. In addition, many Canadians abuse drugs for recreational use.

All drugs—including over-the-counter drugs and prescription drugs—can be dangerous if they are not taken responsibly. Street drugs are especially risky because they are not regulated—other ingredients may be added to a drug. Following are three risks people take when they abuse drugs:

- **Dependence.** Dependence refers to a condition in which the body needs the drug in order to function normally. Without the drug, the user experiences withdrawal; he or she feels sick and can even die from quitting “cold turkey.”
- **Tolerance.** Tolerance refers to a condition in which higher doses of a drug are required to produce the same effect as during initial use. Tolerance increases the risk of dangerous or fatal overdose.
- **Overdose.** Overdose refers to taking too much of a drug. It can cause a serious toxic reaction or death.

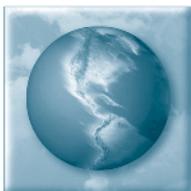
Drugs Most Likely to be Abused

The following groups of drugs are drugs that are most likely to be abused. They have been grouped based on how they affect the user's body and mind.



Opioids

Opioid is a general term, which includes the opiates (drugs derived from the opium poppy) and also synthetic narcotics. The primary purpose of these medications is to relieve pain. Morphine, cocaine, and heroin fall into this group of drugs. Codeine, which is present in some cough syrups, also falls into this group.



For more information on opioids, go to the following website.

http://corp.aadac.com/87_397.asp

Click on *opioids* under the heading *Beyond the ABCs*.

Stimulants

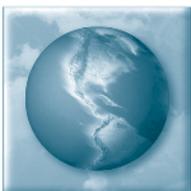
These substances stimulate the **nervous system**. They are used to boost alertness, or to decrease appetite. They also increase blood pressure, heart rate, and breathing rate. Caffeine (found in cola drinks, chocolate, and coffee) and nicotine (found in tobacco) are mild stimulants. Cocaine is a strong stimulant. Stimulants include a group of prescribed drugs called *amphetamines*. When they are illegally sold on the street, they are sometimes called *uppers*.

For more information on amphetamines, go to the following website.

http://corp.aadac.com/87_397.asp

Click on *amphetamines* (under the heading *Beyond the ABCs*).

nervous system: brain, spinal cord and nerves; the nervous system controls the coordination of all body functions



Depressants

These substances generally do the opposite of stimulants; they slow down the nervous system and thereby depress heart rate, blood pressure, and breathing. Alcohol is a depressant because it depresses (slows down) the central nervous system functions. Depressants include a group of prescribed drugs used to treat anxiety and sleep disorders. Diazepam (Valium) and Alprazolam (Xanax) are two examples of depressants that are prescribed for medicinal purposes. Unfortunately, these two drugs are also sold illegally on the street for recreational use. When depressants are illegally sold on the street, they are sometimes called *downers*.

Cannabis

Cannabis includes marijuana, hashish, and hash oil. Often called *pot* or *weed*, cannabis produces mood changes and distorted perceptions; however, the reactions vary. Some users start talking a lot; others become quiet and withdrawn. Some feel relaxed and happy; others have sudden feelings of anxiety or paranoia. Cannabis also stimulates the appetite and reduces pain. In Canada cannabis can be prescribed for medicinal reasons.

For more information on cannabis, go to the following website.

http://corp.aadac.com/87_397.asp

Click on *cannabis* (under the heading *Beyond the ABCs*).



hallucination:
a sensory experience in which a person can see, hear, smell, taste, or feel something that is not actually there

Hallucinogens

These substances, also referred to as *psychedelic drugs*, dramatically alter emotions and thought, and they often cause **hallucinations**. Hallucinogens produced from plants include mescaline from the peyote cactus, and psilocybin from magic mushrooms. Hallucinogens made in laboratories include LSD, PCP, and DMT.

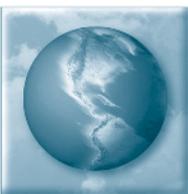
For more information on these drugs, go to the following website.

http://corp.aadac.com/87_397.asp

Click on the link you want (under the heading *Beyond the ABCs*).

9. With a partner or small group, discuss the reasons people abuse drugs.

Compare your answer with the Suggested Responses at the end of the lesson.



Addiction

Facts on Drugs: The Brain and Addiction

Introducing...Your Brain!

The brain is the command center of your body. It weighs about three pounds, and has different centers or systems that process different kinds of information.

The brainstem is the most primitive structure at the base of your brain. The brainstem controls your heart rate, breathing, and sleeping; it does the things you never think about.

Various parts or lobes of the brain process information from your sense organs: the occipital lobe receives information from your eyes, for example. And the cerebral cortex, on top of the whole brain, is the “thinking” part of you. That’s where you store and process language, math, and strategies: It’s the thinking center. Buried deep within the cerebral cortex is the limbic system, which is responsible for survival: It remembers and creates an appetite for the things that keep you alive, such as good food and the company of other human beings. ^{[1],[2]}

The cerebellum is responsible for things you learn once and never have to think about, such as balance when walking or how to throw a ball.

How Does Your Brain Communicate?

The brain’s job is to process information. Brain cells called neurons receive and send messages to and from other neurons. There are billions of neurons in the human brain, each with as many as a thousand threadlike branches that reach out to other neurons.

In a neuron, a message is an electrical impulse. The electrical message travels along the sending

branch, or axon, of the neuron. When the message reaches the end of the axon, it causes the release of a chemical called a neurotransmitter. The chemical travels across a tiny gap, or synapse, to other neurons.

Specialized molecules called receptors on the receiving neuron pick up the chemical. The branches on the receiving end of a neuron are called dendrites. Receptors there have special shapes so they can only collect one kind of neurotransmitter.

In the dendrite, the neurotransmitter starts an electrical impulse. Its work done, the chemical is released back into the synapse. The neurotransmitter then is broken down or is reabsorbed into the sending neuron. ^{[1],[2]}

Neurons in your brain release many different neurotransmitters as you go about your day thinking, feeling, reacting, breathing, and digesting. When you learn new information or a new skill, your brain builds more axons and dendrites first, as a tree grows roots and branches. With more branches, neurons can communicate and send their messages more efficiently. ^[1]

What Do Drugs Do to the Brain?

Some drugs work in the brain because they have a similar size and shape as natural neurotransmitters. In the brain in the right amount or dose, these drugs lock into receptors and start an unnatural chain reaction of electrical charges, causing neurons to release large amounts of their own neurotransmitter.

Some drugs lock onto the neuron and act like a pump, so the neuron

releases more neurotransmitter. Other drugs block reabsorption or reuptake and cause unnatural floods of neurotransmitter. ^[1]

All drugs of abuse, such as nicotine, cocaine, and marijuana, primarily affect the brain's limbic system. Scientists call this the "reward" system. Normally, the limbic system responds to pleasurable experiences by releasing the neurotransmitter dopamine, which creates feelings of pleasure.

What Happens if Someone Keeps Using Drugs?

Think about how you feel when something good happens—maybe your team wins a game, you're praised for something you've done well, or you drink a cold lemonade on a hot day—that's your limbic system at work. Because natural pleasures in our lives are necessary for survival, the limbic system creates an appetite that drives you to seek those things. ^[1]

The first time someone uses a drug of abuse, he or she experiences unnaturally intense feelings of pleasure. The limbic system is flooded with dopamine. Of course, drugs have other effects, too; a first-time smoker may also cough and feel nauseous from toxic chemicals in a tobacco or marijuana cigarette.

But the brain starts changing right away as a result of the unnatural flood of neurotransmitters. Because they sense more than enough dopamine, for example, neurons begin to reduce the number of dopamine receptors. Neurons may also make less dopamine. The result is less dopamine in the brain: This is called down regulation. Because some drugs are toxic, some neurons may also die. ^{[1],[3]}

How Many Times Does Someone Have To Take a Drug To Become an Addict?

No one knows how many times a person can use a drug without changing his or her brain and becoming addicted.

A person's genetic makeup probably plays a role. But after enough doses, an addicted teen's limbic system craves the drug as it craves food, water, or friends. Drug craving is made worse because of down regulation.

Without a dose of the drug, dopamine levels in the drug abuser's brain are low. The abuser feels flat, lifeless, depressed. Without drugs, an abuser's life seems joyless. Now the abuser needs drugs just to bring dopamine levels up to normal levels. Larger amounts of the drug are needed to create a dopamine flood or high, an effect known as tolerance.

By abusing drugs, the addicted teen has changed the way his or her brain works. Drug abuse and addiction lead to long-term changes in the brain. These changes cause addicted drug users to lose the ability to control their drug use. Drug addiction is a disease. ^[1]

If Drug Addiction Is a Disease, Is There a Cure?

There is no cure for drug addiction, but it is a treatable disease; drug addicts can recover. Drug addiction therapy is a program of behaviour change or modification that slowly retrains the brain. Like people with diabetes or heart disease, people in treatment for drug addiction learn behavioural changes and often take medications as part of their treatment regimen. ^[4]

References

1. National Institute on Drug Abuse. The Brain: Understanding Neurobiology Through the Study of Addiction (<http://science-education.nih.gov/Customers.nsf/highschool.htm>): NIH Pub. No. 00-4871.
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3. National Institute on Drug Abuse. Mind Over Matter: The Brain's Response to Drugs Teacher's Guide (http://teens.drugabuse.gov/mom/tg_intro.asp): NIH Pub. No. 020-3592. Bethesda, MD: NIDA, NIH, DHHS. Printed 1997. Reprinted 1998, 2002. Revised 2000.
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Because your brain is still developing, it is much more susceptible to the negative effects of drug and alcohol use.

10. After reviewing “Facts on Drugs: The Brain and Addiction” take this short quiz to test your knowledge.

Quiz: The Brain and Addiction

- a. Neurons in the brain communicate with each other by _____.
 - A. passing axons
 - B. releasing chemicals
 - C. instant messaging
- b. When you do something you enjoy, like watch a good movie, your _____ system “rewards” you.
 - A. limbic
 - B. digestive
 - C. nervous

¹ http://teens.drugabuse.gov/facts/facts_brain1.asp#top NIDA

- c. When someone uses drugs repeatedly, their brain is _____.
- A. trained to crave the drug
 - B. smaller than before
 - C. not changed
- d. After a prolonged period of drug abuse, the brain _____.
- A. needs less drug to get the same effect
 - B. needs more drug to get the same effect
 - C. experiences increasing amounts of dopamine
- e. The brain's limbic system is also known as the _____.
- A. thinking center
 - B. reward system
 - C. comfort system
- f. Brain cells or neurons turn electrical impulses into _____.
- A. chemical signals
 - B. movement
 - C. axons
- g. Drugs work in the brain because they have similar _____.
- A. electrical charges as brain cells
 - B. size and shape as natural brain chemicals
 - C. nerve cells as the brain
- h. Drugs of abuse create intense feelings because they _____.
- A. depress the nervous system
 - B. shut off receptors in the occipital lobe
 - C. cause a flood of dopamine in the limbic system
- i. Drug abusers develop "tolerance" for drugs, meaning they need _____.
- A. more drug to get the same effect
 - B. less drug to get the same effect
 - C. different drugs to get the same effect

Compare your answers with the Suggested Responses at the end of the lesson.

¹ From http://teens.drugabuse.gov/parents/documents/brain_addiction_quiz.doc

Where To Go for Help

You now know more about the effects of the use and abuse of drugs. Stay away from illegal drugs; they are illegal for a reason. Use over-the-counter and prescription drugs responsibly; always read and follow the instructions on the labels. Tell your doctor and pharmacist about any other drugs you are taking—mixing two or more drugs can be dangerous.



If you—or someone you know—has a problem with drugs, you may be wondering what you can do. One place you can turn to for help is your local AADAC office, or you can telephone the 24-hour AADAC Help Line. You might also contact Narcotics Anonymous, which has adopted the principles of Alcoholics Anonymous to support people who are recovering from drug addictions.

Go to page 10 of Assignment Booklet 1B and respond to questions 7 and 8 of Section 2.

Looking Back; Looking Ahead

In this lesson you have been examining the use and abuse of tobacco, alcohol, and other drugs. Hopefully, the information presented in this lesson will help you to make wise lifestyle choices.

Glossary

addiction: the need for something that is physically or psychologically habit-forming

Addictions are characterized by withdrawal symptoms.

blood alcohol concentration (BAC): the percentage of alcohol in the blood. A BAC of .08 means that the blood alcohol concentration is in excess of 80 mg of alcohol per 100 ml of blood

fetal alcohol spectrum disorder (FASD): a term used to describe several permanent, and often devastating birth-defect syndromes caused by a pregnant woman's use of alcohol; also called *alcohol-related birth injury* (ARBI)

hallucination: a sensory experience in which a person can see, hear, smell, taste, or feel something that is not actually there

nervous system: brain, spinal cord and nerves; the nervous system controls the coordination of all body functions

over-the-counter drug (OTC): a drug that does not need a doctor's prescription and can be purchased over the counter at pharmacies or grocery stores

Suggested Responses

1. One of the biggest reasons teens begin smoking is peer influence—their friends smoke and they want to part of the crowd. Teens also start smoking because they believe it will help control their weight or it will help them cope with stress.

People find it difficult to quit smoking because nicotine in tobacco is addictive.

2. Answers will vary. Because some teens—especially girls—start smoking to lose weight, they may find the following statement an ugly truth: “Eating right and exercising are healthy ways to control weight. Smoking is not. Think about how much you could gain when you are unable to even climb a flight of stairs or do a basic workout, because you can't catch your breath.”
3. Responses will vary. Be sure you support your opinions with reasons. Most will agree that smokers do not have the right to make other people ill.
4. Using tobacco in traditional ceremonies is different from smoking for recreational purposes. Tobacco used for traditional purposes has a spiritual meaning. Tobacco used for recreational purposes is highly addictive and harmful.
5. Luke needs to know that using spit tobacco is a health-risking choice. Spit tobacco is just as dangerous as smoking cigarettes. People who use spit tobacco are at risk for cancer of the cheeks, gums, lips, and tongue. In fact, spit tobacco users have a 50% higher chance of getting mouth cancer than non-users.

6. A person can be charged with impaired driving if he or she has a blood alcohol level of 0.08 or greater. If you drive while under the influence you risk causing a collision in which you may harm yourself and other innocent people. Impaired drivers face heavy penalties. Impaired driving causing bodily harm or death has even more serious consequences.
7. Fetal alcohol spectrum disorder (FASD) is a term used to describe several permanent, and often devastating, birth-defect syndromes. It is caused by a woman's use of alcohol during pregnancy. It can be prevented if women do not drink while they are pregnant.
8. **A. False B. False C. False D. True E. True**
F. False G. False H. False I. False J. False
9. People abuse drugs for a variety of reasons. Following are a few:
- ***Because of peer pressure.*** Many teenagers use drugs to go along with a group. It makes them feel like they belong.
 - ***For curiosity.*** Some people experiment with different kinds of drugs out of boredom or interest, and may continue using them.
 - ***Thrill.*** Some people get a thrill out of doing something risky or illegal.
 - ***Social confidence.*** Some people use drugs to overcome shyness and to feel better about themselves in a social setting.
 - ***For dealing with emotional pressure.*** Some people use drugs as a coping mechanism to relieve emotional problems such as stress, anger, anxiety, or depression.

10.

Answer Key: The Brain and Addiction Quiz

- a. B: The transfer of a message from one neuron to another occurs by releasing chemicals called neurotransmitters into the spaces called synapses between the neurons. The axon is the long threadlike fiber that transmits the message.
- b. A: The “reward” system of the brain is called the limbic system. It rewards you by releasing a brain chemical called dopamine, which produces feelings of pleasure.
- c. A: The brain is wired to remember feelings of pleasure, including those produced by drugs unnaturally. The brain then strives to repeat those feelings, which the drug user feels/experiences as a craving for the drug.

- d. B: At first, drug use may cause floods of dopamine. But prolonged drug abuse causes the brain's dopamine levels to decrease. That means the brain will need more of the drug just to get the dopamine levels back to normal and even more to produce the high that it craves.
- e. B: Scientists call the limbic system the reward system because it regulates feelings of pleasure. This region is activated by pleasurable activities such as hanging out with friends. The limbic system is also activated by drugs of abuse.
- f. A: A message travels down a neuron as an electrical impulse. To pass the message to another neuron, the electrical impulse triggers the chemical signals called neurotransmitters, which flow into the synapse (the gap between the two neurons) and trigger an electrical impulse in the next neuron. Axons are the branches of a neuron that release the neurotransmitter.
- g. B: Drugs “fool” the brain because they are similar in size and shape as the natural brain chemicals called neurotransmitters.
- h. C: Drugs of abuse cause dopamine, the neurotransmitter that produces feelings of pleasure, to be released by the brain's limbic system.
- i. A: Drug tolerance makes people need more and more of the same drug to get the same effect because over time, drugs will cause the brain to produce less dopamine, the neurotransmitter that produces feelings of pleasure. Drug abusers need more of the drug than before to reach the same level of dopamine in order to get the same “high.”

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¹ http://teens.drugabuse.gov/parents/documents/brain_addiction_quiz.doc