

Alcohol Abuse ©

<Lesson Plan>

Grade 6

H.E.L.P. for Kids 2008-2009

Teaching messages:

The Nervous System:

1. The nervous system is the command control of our body. It communicates, regulates, coordinates, detects, and responds.
2. The functional cell type in our nervous system is the neuron.
3. Neurons receive and transmit messages through neurotransmitters and receptors.
4. Neurons in the brain do not divide during their lifetime. Thus, damage to these cells is basically irreversible.

Alcohol Abuse:

1. Alcohol enters the blood through the gastrointestinal (GI) tract of the digestive system. It is broken down by the liver at about ½ ounce per hour.
2. Alcohol affects the nervous system. It slows down the transmission of messages leading to a variety of behavioral changes.
3. Alcohol slows down the time for the body to react. Thus, drivers who drink are more likely to cause accidents. Legally, there is zero tolerance for teenagers to have any blood alcohol level for driving.
4. Alcohol abuse can lead to social problems including loss of family, friends, and jobs.

Equipment:

- Laptop and Projector

Materials for Small Group Activity:

- Stopwatch or clock
- Soft ball or projectile
- Drunken goggles (From Vaden Health Center)

The Nervous System

Activity 1 – The Clapping Experiment (8 mins)

This activity is designed to demonstrate all of the functions of the nervous system, which are essential in allowing us to perform even the simplest tasks, such as clapping. Emphasize that the nervous system is the control center of our body, transmitting messages between our brain and all parts of our body.

1. Ask the students to clap 5 times hard.

What made it possible for you to clap your hands?

1. You heard the instructions to clap your hands. Hearing is an important part of our brain function.
2. You understood the instructions, thought about it, and decided to do what we had asked. The ability to *learn, think, and remember* helped you to carry out the instructions to clap your hands.
3. You clapped your hands. Once you decided what to do, you did it. That involved movement. That is, your brain told your hands to clap.
4. Lastly, you felt the sting. That involved *feeling* pain. Your palms told your brain that there was a little stinging or pain.

These are all examples of senses and movements coordinated by the nervous system. There are all sorts of messages going back and forth between the nervous system and other parts of your body when you clap.

Overall Teaching Message #1

The nervous system is the command control of our body. It communicates, regulates, coordinates, detects, and responds.

Even a simple activity that can be done in a fraction of a second takes a series of well-coordinated activities – all carried out by different cells in our body. Our nervous system acts as a big communicating system among these cells. It regulates and coordinates the activities our body does by detecting what is going on in our outside environment, inside our body, and coordinates our responses accordingly.

Our nervous system also acts as the liaison with the outside world. It detects and responds to the environment. Many factors in the environment affect nervous system functions.

In other words, everything we do is regulated and controlled by our nervous system, so if it breaks down or does not function properly, we could be in deep trouble. Therefore, it is something we must do our best to protect, not to abuse!

Activity 2 – Neurons and chain reaction along the neural pathway (12 mins)

For this activity, you will have the students act out the physical transmission of a message. First introduce neurons, and ask students what they remember from having looked at neurons in the Cell lesson. Then, introduce neurotransmitters and receptors and have students do the chain reaction activity. Finally, emphasize that, unlike other cells, neurons do not divide, so damage to these cells is irreversible.

1. Show Slide 3 of “Alcohol Abuse” PowerPoint.

Overall Teaching Message #2

The functional cell type in our nervous system is the neuron.

If our nervous system is a communicating system, how does it send and receive messages throughout our body?

The special functional cell type in our nervous system is the nerve cell, the **neuron**. The human brain contains about 100 billion neurons, which receive and transmit information throughout our body. They range from being microscopic to being several feet long!

What do you remember about neurons and what they look like from looking at pictures of them in the Cell lesson?

Regardless of the shape and the size, all neurons have a similar basic structure. **Dendrites** receive messages and **axons** send out messages. These messages move through the cell as an electrical impulse from one neuron to the next. The messages of one neuron could be sent to another neuron, then another neuron, and so on to start a chain reaction. Or, they could be sent to the target such as a muscle.

2. Show Slide 4 – Slide 8 of “Alcohol Abuse” PowerPoint.

These slides depict the mechanism of inter-neuron communication. As you progress through the slides, explain the active roles synapses, neurotransmitters, and receptors play in the transfer of a message from one neuron to the next.

Overall Teaching Message #3

Neurons receive and transmit messages through neurotransmitters and receptors.

What is a neurotransmitter?

A **neurotransmitter** is a chemical that allows the neurons to communicate with each other. Communication of information between neurons is accomplished by the movement of neurotransmitters across a small gap called the synapse.

A **synapse** is the gap between the axon of one neuron and the dendrite of another neuron through which neurotransmitters are transmitted. A neurotransmitter released from one neuron travels across the synapse and attaches to a receptor on another neuron.

A **receptor** is a structure on the surface of a cell that binds to a specific chemical that wants to enter the cell. In the case of a neuron, there are specific receptors which bind specific neurotransmitters. The neurotransmitter and the receptor work like a key and a lock; they are selective and specific.

3. Have students act out and experience the chain reaction along the neural pathway.

1. Ask students to stand in a circle and hold hands with the people to the right and left of them. (One teacher should also participate in the circle, and the other teacher will be responsible for timing the activity.)
2. Instruct the students that when you say go, the teacher in the circle will begin by squeezing the hand of the student to his/her right. When that student feels the squeeze on his/her left hand, he/she will then squeeze the hand of the student on his/her right and so on around the circle.
3. When the signal has traveled all the way around the circle back to the teacher, the activity is over.
4. One teacher must use a stopwatch to time how long it takes for the signal to travel all the way around the circle.
5. Have the students repeat the activity 2 more times and time them to see how quickly the message can be transmitted around the circle.

Explain that each of the students is acting like an individual neuron sending the message around the circle and that the neuronal pathway works in much the same way as one neuron responds to the other. How fast could the class pass the signal all the way around the signal? Explain that messages in neurons travel at much faster speeds up to *268 miles per hour!*

Overall Teaching Message #4

Neurons in the brain do not divide during their lifetime. Thus, damage to these cells is basically irreversible.

What do you think would happen if we damaged our brain and spinal cord in some way?

Damage to the brain is often *irreversible*. This means that it will not heal if it gets damaged. Not only that, most of the neurons in our brain do not divide during our lifetime as most of our other cells do, so we only have a limited number of neurons that we were born with. So, if they are damaged, they are damaged or gone forever. These damages can be caused by accidents, injuries, diseases, and alcohol or drug use. Imagine not being able to move your arms or your legs, or to feel, see, hear, or think normally. Since our nervous system controls everything we do, we must protect it and not damage it.

Alcohol Abuse

Do you know people who drink alcohol on social occasions? Is that considered alcohol abuse? If not, how do you define “alcohol abuse”?

About 80% of adults in the United States drink alcohol, ranging from those who drink socially to those who abuse alcohol. **Abuse** of alcohol means that abusers drink so much alcohol on a regular basis their ability to function normally personally and professionally is impaired.

According to the law, it is illegal to drink before the age of 21. People under 21 are not allowed to buy alcohol in stores or order alcohol in restaurants including beer, wine, and anything containing alcohol.

Today, alcohol is the third leading cause of preventable death, trailing only behind tobacco and obesity. It is important to understand how this common and popular beverage can have such harmful effects.

Teaching Message #1:

Alcohol enters the blood through the gastrointestinal (GI) tract of the digestive system. It is broken down by the liver.

If alcohol is a beverage and travels through our digestive system, how do you think it enters our blood?

Alcohol gets into the blood mostly through the small intestines in the same way food does. Just like anything else, once in the blood, the alcohol is transported throughout the body to reach all organs. The liver is the major organ in the body that breaks down (metabolizes) alcohol, as it does other toxic materials in the body.

Activity 1 – Effect of Alcohol on the Nervous System (8mins):

For this activity, discuss with students the behavior of people who have had too much to drink and explain the physiological reasoning for such behavior. The reaction time activity is designed to demonstrate the effects of delayed reaction time caused by drinking too much alcohol.

Teaching Message #2:

Alcohol affects the nervous system. It slows down the transmission of messages and is a depressant. It can lead to a variety of behavioral changes.

How do people who have consumed too much alcohol act or behave?

Heavy drinkers stagger when they walk, have slurred speech, fall over things, and cannot control when they urinate. They act this way because alcohol has affected their nervous system. This results in a loss of coordination, balance, and motor skills.

Alcohol is a **depressant**. It slows down the nervous system, i.e. the transmission of messages throughout our body. Mentally, alcohol also reduces inhibition (a feeling of fear or embarrassment that stops someone from certain actions in public) because it affects the neurons in the part of the brain that controls inhibition. When people have consumed too much alcohol, they may also talk a lot, even though their speech does not make any sense. In addition, their sense of judgment is also damaged so it is difficult for them to judge whether something is right or wrong.

Teaching Message #3:

Alcohol slows down the time for the body to react. Thus, drivers who drink are more likely to cause accidents.

Because alcohol causes messages to travel more slowly throughout our body, our reaction time also decreases. This may lead to car accidents, which hurt both the driver and anybody else involved in the crash.

Why is it dangerous to get into a car with somebody who has been drinking?

Drivers with alcohol in their blood are more likely to have accidents because it takes them longer to react to unexpected and dangerous situations. They could hurt not only other people but also themselves. In 2007 in this country, one person died every 40 minutes in an alcohol-related traffic accident, and one person injured every minute. About 40 percent of all deaths from car crashes were alcohol-related. About 3 in every 10 Americans will be involved in an alcohol-related crash at some time in their lives.

In California, there is a “zero tolerance” law for people under 21. That is, you are not supposed to have any alcohol in your blood when you are driving.

1. Ask for two volunteers. Have one student standing with his or her back against the wall. The other should stand 7 or 8 feet away with a projectile/ball.
2. Instruct the person with the ball to throw it at the person at the wall.
3. Instruct the person to get out of the way before he or she gets hit.
4. In the second trial, instruct the person against the wall to wait two seconds before moving to avoid the ball (the instructor should audibly count the two seconds). The student will most likely get hit by the ball.

Explain that this is what happens when a person’s reaction time is slowed down by a couple seconds after he/she has been drinking alcohol. Relate the activity to drunk driving. Equate the ball to a car, and equate the delayed two seconds to the slowed reaction time caused by alcohol. Car accidents hurt both the driver and anybody else involved in the crash.

Activity 2 – Small Group Discussion (14mins):

For this activity encourage students to share their thoughts and experiences about alcohol and/or alcohol abuse in small groups.

1. Split the class into smaller groups with each teacher leading one discussion group.

Discuss the following:

- 1) Personal experiences. Encourage students to talk about what their and experiences with alcohol, not only with themselves but with their friends and family.
- 2) Discuss the pros and cons of drinking.

Teaching Message #4:

Alcohol abuse can lead to social problems including loss of family, friends, and jobs.

What other types of serious problems could be caused by alcohol abuse?

The social consequences of alcohol abuse could be serious, affecting a large population of people. Because of what alcohol could do to the nervous system of the drinkers, their behavior under the influence of alcohol could be out of control, unreasonable, violent, depressed, and generally difficult to deal with for others around them, such as family, friends, and colleagues. Oftentimes, they could lose their jobs.

It is important to distinguish between alcohol use versus abuse. At some point, the majority of people will try out alcohol. Most people who do drink alcohol are aware of the amount that they take in. People who drink a modest amount of alcohol at a sitting are known as social drinkers. They drink because they like the taste of alcohol, enjoy the company to drink with, and/or feel the effect of relaxation. They know when to stop. If they have drunken too much, they make sure never to drive and will wait until they have sobered up.

Problems start when one drinks too much or becomes dependent on alcohol to “feel good” or to “solve problems.” They eventually become alcoholics, or alcohol abusers.

Activity 2 – Drunken Goggles (8mins):

1. Ask class to line up into two lines (one pair of drunken goggles per line).
2. Give each student a time limit to walk around while wearing the drunken goggles before they pass it on to the next person. Make sure there is enough space for the students so that they will not crash into desks, counters, or walls.

Explain that movement and vision through these goggles is similar to how vision and movement can be distorted when drunk.