

Alcohol's Effect on the Mind and Body

WHAT YOU NEED

- [Alcohol's Effect on the Mind and Body](#)

ESHEET

- [Learning about Teen Drinking](#)

STUDENT ACTIVITY SHEET

- [Letter for Parents/Caregivers](#)

TEACHER SHEET

- [Background Information about Teen Alcohol Use](#)

TEACHER SHEET

- [The Science Inside Alcohol Project E-Book](#)

TOOL | INTERACTIVE

- [Learning about Teen Drinking Teacher Sheet](#)

TEACHER SHEET

MATERIALS

- Newsprint and markers



PURPOSE

To understand the short- and long-term effects that alcohol has on the mind and body as a first step in understanding why teenage drinking is a serious problem.

CONTEXT

This lesson is part of a series being created by Science NetLinks as part of **The Science Inside Alcohol Project** (<http://www.aaas.org/sites/default/files/migrate/uploads/siapbrochure.pdf>), funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). For a complete list of materials, visit **The Science Inside Alcohol: Educational Materials** (<http://www.aaas.org/page/science-inside-alcohol-educational-materials>). The project will develop an interactive, Web-based science and health interactive and four accompanying lesson plans that teach middle-school students about how alcohol affects the human body.

This lesson was produced under Grant #1R25AA016107-01A1, NIAAA.

To provide you with sufficient background to teach this lesson, a **Background Information about Teen Alcohol Use** teacher sheet has been provided. The teacher sheet provides information about alcohol consumption among teens and preteens, the long- and short-term effects of moderate and heavy alcohol consumption, and facts about how alcohol is metabolized by the body. This sheet can be used as a reference throughout the lesson.

Because alcohol use among young people is so prevalent, it is essential that they become aware of the potential dangers of alcohol use at an early age. This lesson is the first in a series designed to inform students about the risks associated with drinking. Research has shown that the younger students are when they begin learning about alcohol use, the greater their likelihood of staying away from it (**Make a Difference: Talk to Your Child about Alcohol** (http://pubs.niaaa.nih.gov/publications/MakeADiff_HTML/MakeAdiff.pdf). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 2000).

In the Motivation part of the lesson, students read a newspaper article about a girl who died after a night of drinking. They discuss what happened and what could have been done to prevent it. Students are encouraged to share feelings, such as surprise, fear, or anxiety, evoked by this story. The purpose of this reading is to make students aware of the seriousness of teen drinking.

During the Development part of the lesson, students answer a series of ten true/false questions about alcohol use. This exercise serves as a pre-assessment to find out what students know about alcohol use. It also will be used as a starting point for a research project. After students take the pre-assessment survey, they

will work in pairs to research one of the questions. Then they will report their findings to the class. Some pairs may work on the same question, but for this activity, that doesn't matter. The main point is for students to begin finding out more information about alcohol use among young people.

In addition, ideas in this lesson are also related to concepts found in these alcohol learning goals:

- There can be both short-term and long-term consequences, even with moderate levels of drinking.
- Humans vary widely in their ability to absorb and eliminate alcohol. Alcohol's effects are influenced by gender, body weight, and body type.
- Alcohol affects many body systems. For example, alcohol has been shown to change the structure and function of the kidneys and impair their ability to regulate the volume and composition of fluid and electrolytes in the body.

PLANNING AHEAD

To provide you with sufficient background to teach this lesson, you can visit **The Science Inside Alcohol Project** (<http://www.aaas.org/sites/default/files/migrate/uploads/siapbrochure.pdf>), which includes additional educational material. You can also read **Delaying That First Drink: A Parents' Guide** for the latest research on the impact of alcohol on the growing body and tips on how to talk to kids about drinking.

MOTIVATION

Begin the lesson by asking students to use their **Alcohol's Effect on the Mind and Body** student esheet to go to the **Science Inside Alcohol Project** e-book. Once there, they should read the Home page and Introduction. Follow up this reading by discussing the questions from the Introduction:

- Why does drinking too much alcohol affect how you behave?
- What is it about how alcohol affects our bodies that can make us change both mentally and physically?

Now hand out the **Learning about Teen Drinking** student sheet. Give students a few moments to read the selection. Be aware that the story is disturbing and could upset some middle-school students. Nonetheless, it is important for them to understand at an early age the potential dangers of alcohol use. Before the class reads the article, tell them that it represents the "worst case scenario" of what can happen with excessive alcohol use. Tell students that its purpose is to get them thinking about why alcohol use should be taken so seriously.

Next, either discuss the questions listed after the reading as a class or divide the students into small groups to go over them. Possible answers to the questions are given below.

- What is your reaction to this article? (Answers will vary.)

- How did alcohol affect the girl's behavior?

(Alcohol probably affected the girl's judgment and coordination. If she had been thinking more clearly, she would not have been leaning so far out the window. If her coordination and balance hadn't been affected, she probably wouldn't have fallen. This article is an example of what can happen when people drink too much alcohol.)

- What would you like to know about alcohol use as a way to prevent such incidents from happening?

(Answers will vary. Use this question as an opportunity to discuss students' thoughts, feelings, and fears about alcohol use. This could be a good opportunity to discuss how people of legal drinking age can avoid drinking too much and reduce potential harm to themselves and others.)

DEVELOPMENT

Ask students to turn to Part 2 of their student sheet. Give them about 15 minutes to answer the questions on the survey. You can find the answers to the questions on the [Learning about Teen Drinking](#) teacher sheet.

After students have answered the questions, either assign a partner to each student, or have students pick their own partners. Give each pair a question to research. For this activity, it doesn't matter if more than one pair of students is working on the same question. The goal is for students to begin learning more about alcohol use. If students had answered the question correctly, they should write a paragraph providing more information about the topic. If they had answered it incorrectly, they need to explain how their thinking has changed as a result of their research.

To help with their research, students should use their [Alcohol's Effect on the Mind and Body](#) student esheet, which will help them go to these sites:

- [Alcohol and the Human Body](#)
- [The Cool Spot](http://www.thecoolspot.gov/index.asp) (<http://www.thecoolspot.gov/index.asp>)
- [Alcohol and Your Body](http://brown.edu/Student_Services/Health_Services/Health_Education/alcohol,_tobacco,_&_other_drugs/alcohol/alco) (http://brown.edu/Student_Services/Health_Services/Health_Education/alcohol,_tobacco,_&_other_drugs/alcohol/alco)
- [How Alcohol Works](http://science.howstuffworks.com/alcohol5.htm) (<http://science.howstuffworks.com/alcohol5.htm>)

For more detailed information about the physiological effects of alcohol, students can consider these sites:

- [Alcohol and the Brain](http://faculty.washington.edu/chudler/alco.html) (<http://faculty.washington.edu/chudler/alco.html>)
- [Biological Impacts of Alcohol Use: An Overview](http://www.oregoncounseling.org/ArticlesPapers/Documents/ETOHBIOfx.htm) (<http://www.oregoncounseling.org/ArticlesPapers/Documents/ETOHBIOfx.htm>)
- [Interactive Body](http://www.collegedrinkingprevention.gov/CollegeStudents/anatomy/InteractiveBody_flash.aspx) (http://www.collegedrinkingprevention.gov/CollegeStudents/anatomy/InteractiveBody_flash.aspx)

After students have completed their research, collect their paragraphs and use them

as a pre-assessment of students' current knowledge about alcohol and its effects on the brain and body. This information can be used in planning future lessons.

ASSESSMENT

Have students present their findings to the class. As you listen to their reports, consider these questions:

- Do students seem comfortable with the subject matter?
- Have they absorbed the information?
- Has students' research corrected many of their misconceptions about alcohol, or do they still have work to do to correct their erroneous ideas?

Ask students if they have some questions about alcohol use that they would like to see addressed in future lessons. Write down their ideas on a sheet of newsprint and use it as a resource when planning additional lessons.

To help students “stay with the program,” have them involve their parents or caregivers. To inform parents/caregivers about students' work on this topic, consider using the [Letter for Parents/Caregivers](#).

EXTENSIONS

The concepts in this lesson can be extended by leading students through these other Science NetLinks lessons on the science inside alcohol:

- [Alcohol and Its Impact on the Brain](#)
- [Alcohol's Effects on Organs](#)
- [The Social Ramifications of Alcohol Abuse](#)

After learning about the effects of alcohol on the body and mind, the next step is to develop strategies for resisting peer pressure and “saying no” to alcohol use. If students are ready for this topic, [Make a Difference: Talk to Your Child about Alcohol \(http://pubs.niaaa.nih.gov/publications/MakeADiff_HTML/MakeAdiff.pdf\)](http://pubs.niaaa.nih.gov/publications/MakeADiff_HTML/MakeAdiff.pdf) provides useful information:

 [Send us feedback about this Lesson >](#)

RELATED RESOURCES

[Skin Cells >](#)

6-8

[Plants 2: Plant Propagation >](#)

Learning about Teen Drinking Teacher Sheet



INTRODUCTION

What do students already know about teen drinking? Is the information they have correct? These true/false questions will help you find out.

Alcohol affects every system in the body.

True. Consuming too much alcohol affects the brain and causes unclear thinking, poor coordination, and slurred speech. It affects the eyes and causes blurred vision by affecting the metabolism of glucose in the brain. Alcohol can affect the heart by causing an irregular heartbeat and high blood pressure. Drinking too much alcohol over a period of years also can cause damage to the liver, stomach, pancreas, or kidneys. It can cause blood vessels to widen, resulting in headaches. Finally, alcohol abuse can cause systemic muscle weakness.

Alcohol only affects the body in the short term.

False. Over time, alcohol abuse can cause even greater damage to other body systems, resulting in permanent liver damage and damage to the frontal lobes of the brain.

Alcohol affects teens the same way it affects adults.

False. Alcohol has a less sedating effect on teens than it does on adults. As a result, teens may be more likely to drive under the influence, which can lead to car accidents. Teens also show signs of reduced function in the hippocampus, the part of the brain critical for forming new memories. As a result, young drinkers score lower on standardized tests than non-drinkers.

Alcohol is a stimulant, meaning that it accelerates the workings of the body's key functions.

False. Alcohol is a depressant. It slows the body's key functions, including breathing, heartbeat, and thinking.

Alcohol abuse can cause problems just as marijuana and other drugs can.

True. Like marijuana, alcohol is a drug, and it affects all body systems over the short and long term.

A 12-ounce can of beer, a five-ounce glass of wine, and a standard mixed drink (1.5 ounces of hard liquor) all contain the same amount of alcohol.

True.

Coffee or a shower helps people become sober faster.

False. It takes over one hour for a standard drink of alcohol [beer, wine, or liquor] to work its way out of the bloodstream.

Teens who drink are more likely to be victims of violent crimes and be involved in alcohol-related traffic accidents.

True, in part because of the impaired judgment and coordination that results from alcohol use.

Alcohol use is not common among teens.

False. According to one national survey, one in four eighth graders reports drinking alcohol within the past month and 18% of eighth graders have gotten drunk at least once in the past year.

This teacher sheet is a part of the **Alcohol's Effect on the Mind and Body** lesson.

Background Information about Teen Alcohol Use



INTRODUCTION

This teacher resource looks at some research about teen alcohol consumption.

Alcohol consumption is widespread among preteens and teens. According to one national survey, one in four eighth graders reports drinking alcohol within the past month and 18% of eighth graders have gotten drunk at least once in the past year (**[Make a Difference: Talk to Your Child about Alcohol](http://pubs.niaaa.nih.gov/publications/MakeADiff_HTML/MakeAdiff.pdf)** (http://pubs.niaaa.nih.gov/publications/MakeADiff_HTML/MakeAdiff.pdf), Rockville, MD, National Institute on Alcohol Abuse and Alcoholism, 2000).

A recent survey from the Substance Abuse and Mental Health Service's National Household Survey on Drug Use and Health reported that about 28% of young people between the ages of 12 and 20 said that they had had a drink in the last month, more than 18% of young people in that age group said that they were binge drinkers (meaning that they had five or more drinks in one sitting), and 6% said that they were heavy drinkers (Who's Using Alcohol. Family Guide, Keeping Youth Mentally Healthy & Drug Free. U.S. Department of Health and Human Services. 2007).

While many people may think that drinking is less serious than drug use, that is not the case. Alcohol is a depressant, which means that it slows body functions, including heartbeat, breathing, and thinking. Drinking alcoholic beverages can have other effects on the body, such as those listed below (**[Alcohol and the Brain](http://faculty.washington.edu/chudler/alco.html)** (<http://faculty.washington.edu/chudler/alco.html>), Neuroscience for Kids. Eric H. Chudler. 1996-2007; **[The Cool Spot](http://www.thecoolspot.gov/index.asp)** (<http://www.thecoolspot.gov/index.asp>)).

Short-Term Effects of Drinking in Moderation

- Stress and tension reduction
- Mood enhancement
- Increased relaxation
- Reduction of social anxiety
- Increased pleasure
- Improved social cohesion

Short-Term Effects of Drinking Too Much

- Slurred Speech
- Drowsiness
- Confusion
- Poor coordination
- Dizziness
- Vomiting
- Blurred vision

Long-Term Effects of Drinking in Moderation

- Longer life
- Reduced risk of heart disease and heart attack
- Increased ability to survive a heart attack
- Reduced risk of stroke
- Reduced risk of gallstones
- Reduced risk of kidney stones
- Reduced risk of diabetes
- Reduced risk of rheumatoid arthritis
- Reduced risk of metabolic syndrome
- Reduced risk of dementia, including Alzheimer's disease

Long-Term Effects of Drinking Too Much over a Period of Years

- Liver damage
- Stomach ulcers and irritation to the pancreas
- Prevention of the kidneys from maintaining a proper balance of fluids and minerals
- Widening of the veins and arteries, resulting in headaches and loss of body heat
- Reduction of the body's ability to produce red blood cells, resulting in anemia and infections
- Muscle weakness, including of the heart muscle

In addition to these systemic effects, alcohol also may have a greater impact on teens than it does on those adults over the age of 20. There is evidence that alcohol has less of a sedating effect on young people, so

they are more likely to think that they can drive safely. Because their judgment and coordination may be impaired, and because of their lack of extensive driving experience, their chances of having a car accident increase. Some teens also show signs of reduced function in the hippocampus, the part of the brain critical for forming new memories.

Parents and other adults over age 20 often drink in moderation. Doing so is responsible if they are not pregnant, taking certain medications, or drinking is not otherwise contraindicated. Drinking in moderation is associated with better health and longer life than is either not drinking or abusing alcohol. A drink a day for a woman and two drinks a day for men is considered moderate consumption by the federal government.

It's very important to know that standard drinks of beer, dinner wine, and distilled spirits (liquor) contain an equivalent amount of alcohol (6/10 of one ounce). Standard drinks are a 12-ounce can or bottle of beer, a five-ounce glass of dinner wine, and a shot (1 and ½ ounces of distilled spirits, either straight or in a mixed drink). It takes over an hour for the alcohol in a standard drink to work its way out of the body. Drinking coffee, taking cold showers, or exercising does not speed up this process.

This teacher sheet is a part of the **Alcohol's Effect on the Mind and Body** lesson.

Learning about Teen Drinking



INTRODUCTION

This sheet contains a fictional story that is meant to help you understand the potential dangers of alcohol use. It represents the "worst case scenario" of what can happen with excessive alcohol use. Its purpose is to get you thinking about why alcohol use should be taken so seriously.

Part 1: The Consequences of Teen Drinking

As an introduction to the issue of teen drinking, read this short article with your class. Be aware that the story is upsetting, but it represents the worst possible outcome after drinking. Most people do not experience such severe consequences. But it is important to understand why drinking can be dangerous. This article is a way to learn about this.

After reading the article, discuss the questions listed below with your classmates or in a small group.

Student dies in fall from 6th-floor apartment window

By **BRIAN McCLINTOCK** Collegian Staff Writer

An 18-year-old Penn State University student fell to her death from a sixth-floor downtown apartment window early yesterday morning.

Late-night partiers and pedestrians stood in stunned silence as police and other people unsuccessfully administered CPR to a young woman on the sidewalk of East Beaver Avenue.

The girl was at a party at 611 Alexander Court, 309 E. Beaver Ave., where she and another girl were leaning out of adjacent windows just before she fell six stories onto the sidewalk below at about 2:30 a.m., the State College Police Department said.

She was pronounced dead at 3:16 a.m. yesterday morning, said the clinical coordinator at Centre Community Hospital.

While police have ruled the death accidental, an investigation continues "into the matter of the girl being provided alcohol at the party while being under the age of twenty-one," police said in a news release. The girl fell out of the 6th story window after a night of drinking - and died.

Discussion Questions

What is your reaction to this article?

How did alcohol affect the girl's behavior?

What would you like to know about alcohol use as a way to prevent such incidents from happening?

Part 2: Student Survey

What do you already know about teen drinking? Is the information you have correct? Answer these true/false questions and find out.

1. Alcohol affects every system in the body.
2. Alcohol only affects the body in the short term.
3. Alcohol affects teens the same way it affects adults.
4. Alcohol is a stimulant, meaning that it accelerates the workings of the body's key functions.
5. Alcohol abuse can cause problems as can marijuana and other drugs.
6. A 12-ounce can of beer, a five-ounce glass of wine, and a standard mixed drink (1.5 ounce of hard liquor) all contain the same amount of alcohol.
7. Coffee or a shower helps people become sober faster.
8. Teens who drink are more likely to be victims of violent crimes and be involved in alcohol-related traffic accidents.
9. Alcohol use is not common among teens.

Letter for Parents/Caregivers



Dear Parent/Caregiver:

Your child has been working on a lesson entitled *The Effects of Alcohol on the Mind and Body*. Along with the class, your child has been learning about the short- and long-term effects of alcohol use. They also have taken a short survey to find out what they already know about the topic and what misconceptions they may have.

We wanted to inform you about our work on this lesson so that you will be prepared to discuss these issues at home. A helpful resource for getting a productive conversation started is *Make a Difference: Talk to Your Child about Alcohol*, which is available online at:

<http://www.alcoholfreechildren.org/en/pubs/pdf/makeadifference.pdf>. Over the next few weeks, we will discuss other topics related to teen drinking, including peer pressure and strategies for saying no.

Thank you for your support of our work on this important topic. If you have any questions, please do not hesitate to get in touch.

Sincerely,

This teacher sheet is a part of the **Alcohol's Effect on the Mind and Body** lesson.