

## ***The Effects of Alcohol on Human Reactions***

### **Pre-Lab Discussion**

*Ethyl alcohol* is a drug that is absorbed directly into the bloodstream from the stomach and small intestine. It takes only two minutes, and even less on an empty stomach, for the alcohol to reach the bloodstream. The blood carries the alcohol to various parts of the body. The liver is the major organ that metabolizes ethyl alcohol to carbon dioxide and water and releases energy.

Alcohol acts as a depressant on the central nervous system. High blood-alcohol concentrations tend to reduce the activity of bodily functions. The result is a numbing, or anesthetic, effect on the central nervous system. Alcohol affects the areas of the brain controlling judgment, memory, emotion, speech, vision, motor skills, muscular coordination, and balance. Heart, digestive, and respiratory rates slow down under the influence of alcohol.

In this investigation, you will simulate some of the effects of alcohol without really drinking any alcohol.

### **Problem**

What are the effects of alcohol on a person's reactions?

### **Materials** (*per group*)

Masking tape  
Watch or clock with second hand  
Pencil

### **Safety**

Do not spin around in this investigation if you are under a doctor's care, have dizzy spells or heart problems, or are unable to participate in physical education classes.

### **Procedure**

#### **Part A. Walking the Line**

1. Using masking tape, make a straight line about 3 meters long on the floor. One member of your group should walk from the beginning of this line to the end, putting the heel of one foot right against the toe of the other. A second member of the group should time how long it takes the person to walk from one end of the line to the other. A third group member should keep track of the number of times the walker accidentally misses the line.
2. To simulate the effect of drinking an excess amount of alcohol, the walker should spin around in place for 10 seconds. Be certain that the area is cleared of furniture and other obstacles. The other group members should stand nearby and act as spotters ready to catch the spinner if he or she starts to fall. **CAUTION:** *Do not spin if you are under a doctor's care, have dizzy spells or heart problems, or are unable to participate in physical education classes.*

3. As soon as the person finishes 10 seconds of spinning, lead him or her to the beginning of the line and have him or her repeat the walk described in step 1. Be sure to record the time and number of misses in Data Table 1.
4. Repeat steps 1 through 3 with each group member having an opportunity to be the walker. Record their results in Data Table 1.

**Part B. Connecting the Dots**

1. The object of this test is to draw a wavy line through the dots as shown in the sample in Observations. One of your group members will time you for 10 seconds while you connect as many dots as you can. At the end of 10 seconds, give yourself one point for each dot you cross and for each time you touch the top or bottom line without crossing over it. Record this information in Data Table 2.
2. Repeat the spinning procedure described in step 2 of Part A. Then repeat the dot test and see how many points you score this time. Record this information in Data Table 2.
3. Repeat steps 1 and 2 with each member of your group having an opportunity to connect the dots. Record their results in Data Table 2.

**Part C. Using Statistics to Construct Graphs on Alcoholism**

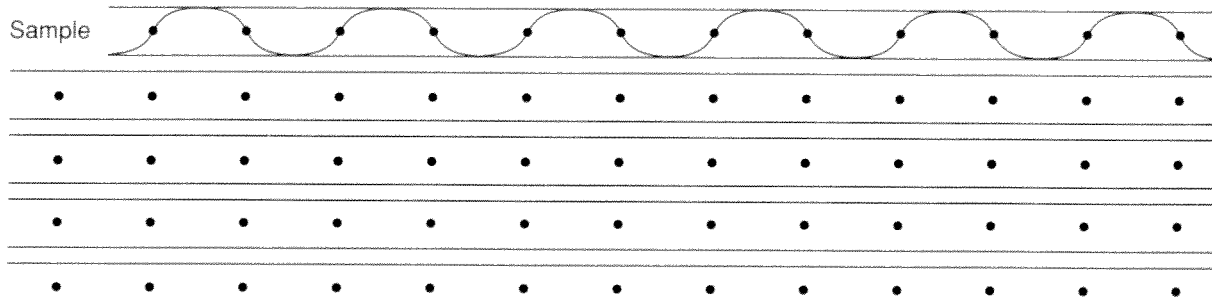
1. It is estimated that there are 14 million alcoholics in the United States. Of this number, 3.5 million are teenagers, 13 to 17 years old. Among teenage alcoholics, 6.25% are females.
2. On the circle graph in Observations, indicate the portion of the total population of alcoholics who are between the ages of 13 and 17, and male. Also indicate the number of female alcoholics between the ages of 13 and 17.
3. A recent survey of teenage drinking habits revealed the following:
  - 62% drank alcoholic beverages occasionally
  - 19% tried alcohol once
  - 18% never tried alcohol
  - 1% no comment

Use the circle graph in Observations to graph these survey results.

**Observations**

**Data Table 1**

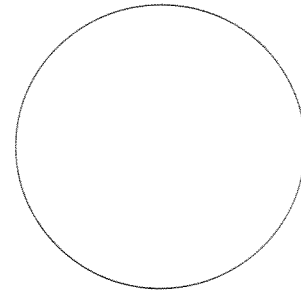
Name	Before Spinning		After Spinning	
	Time (sec)	Mistakes	Time (sec)	Mistakes



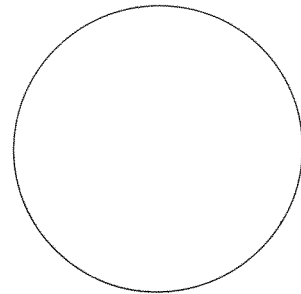
**Data Table 2**

Name	Score Before Spinning	Score After Spinning

**Alcoholics in the United States**



**Teenage Drinking Habits**



**Analysis and Conclusions**

1. Based on your observations in this simulation of drinking alcohol, what effect does alcohol have on a person's reactions? \_\_\_\_\_  
\_\_\_\_\_
2. What is the effect of alcohol on the central nervous system? \_\_\_\_\_  
\_\_\_\_\_
3. According to the statistics given in Part C, what percentage of the total population of alcoholics are between the ages of 13 and 17? \_\_\_\_\_  
\_\_\_\_\_

**Critical Thinking and Application**

1. Why is alcohol technically classified as a legal drug? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Alcohol is known to be a depressant. Why then does the consumption of alcohol sometimes result in a feeling of happiness? \_\_\_\_\_

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3. Explain why alcoholism is considered to be a disease. \_\_\_\_\_

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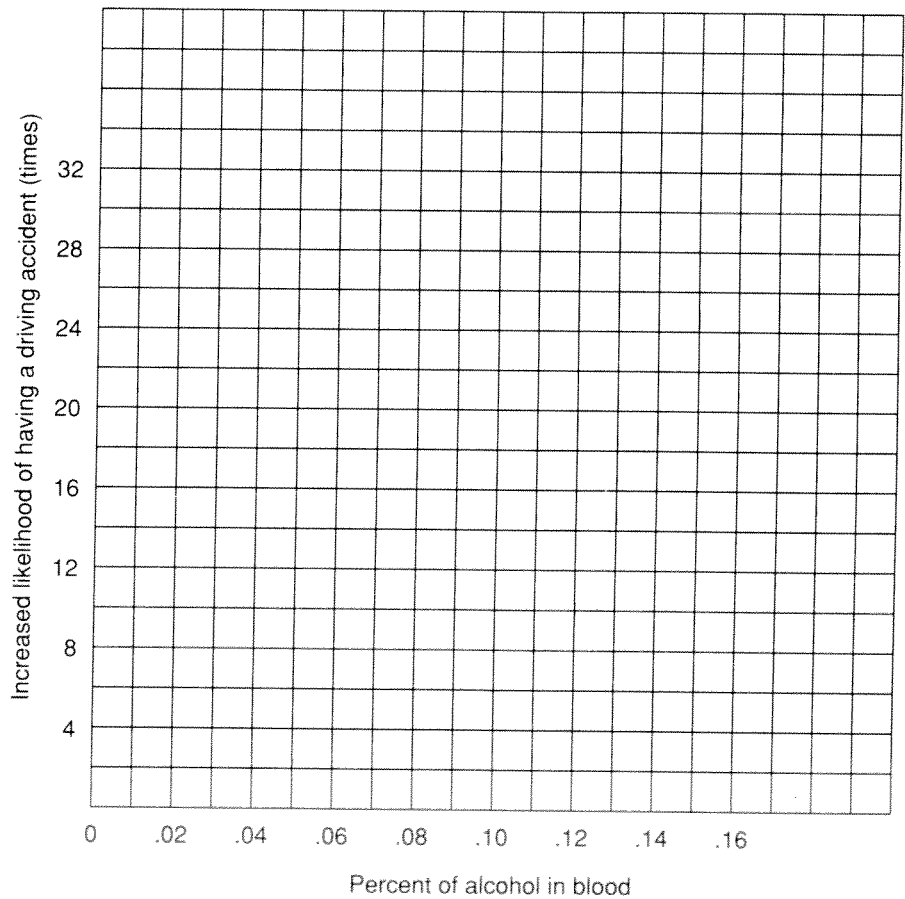
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4. Use the information in the accompanying chart to construct a line graph. Does the likelihood of having an accident increase proportionally with the amount of alcohol in the blood?

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% of Alcohol in Blood	Increased Likelihood of Having an Accident While Driving
0.00	1.0 x
0.02	1.5 x
0.04	2.0 x
0.06	2.5 x
0.08	4.0 x
0.10	6.0 x
0.12	10.0 x
0.14	19.0 x
0.16	30.0 x



### Going Further

1. Call your local chapter of Alcoholics Anonymous, Al-Anon, or Alateen and request information about the warning signs of alcoholism.
2. Using resources from within your community, prepare a panel discussion on topics related to drugs and their abuse that would interest students in your biology class. Invite outside experts from law enforcement groups, local and federal government agencies, and the medical profession to discuss these topics.