

DRINKING AND DRIVING DON'T MIX

SCIENCE/ ENVIRONMENTAL STUDIES 14 - 16 WORKSHEET 9

There are strict legal limits for the maximum amount of alcohol that can be in a person's blood when they drive. This is because drinking alcohol (even just one drink) affects a person's judgement and reduces their ability to see and hear things clearly. These effects make it much more likely that the driver will be involved in an accident.

Alcohol's effect on the brain slows down a person's reaction times - they take longer to respond to situations and hazards. If the person is driving a car (or riding a moped, motorcycle or bicycle), their 'thinking distance' is increased. For example, if a cat ran out in front of the car, there is a short delay between the driver seeing the hazard and putting their foot on the brake. The distance travelled by the car during this time is the 'thinking distance'. It is estimated that just one alcoholic drink can increase a driver's thinking distance by up to 20%.

In England, Northern Ireland and Wales it's against the law for an adult to drive with more than 80 mg alcohol per 100 ml of their blood. The limit is now lower in Scotland at 50 mg of alcohol per 100 ml of blood. Because you can't measure blood alcohol concentration (BAC) simply by the number of drinks you've had, people who are planning to drive should avoid drinking any alcohol beforehand. Drivers who have consumed alcohol are also much more likely to have an accident. Those who break the law can face a minimum 12-month driving ban, be sent to prison for up to 6 months or get an unlimited fine - or both. An offence stays on the driving licence for 11 years. Causing death by careless driving while under the influence of alcohol carries a penalty of up to life imprisonment.

ACTIVITY ONE

Look at the table below. It shows the thinking distance and the braking distance - which together make up the total stopping distance - for cars at different speeds on a dry road with good brakes. Distances are given in metres (m) as well as car lengths (where 1 car = 4m long) The speed of the car is given in metres per second (m/s) and miles per hour (mph).

Car speed		Thinking distance		Braking distance		Total stopping distance	
m/s	mph	m	cars	m	cars	m	cars
13	30	9	2.25	14	3.5	23	5.75
22	50	15	3.75	38	9.5	53	13.25
30	70	21	5.25	75	18.75	96	24

1. Plot a graph to show how thinking distance, braking distance and total stopping distance are affected by the speed of the car. What conclusions can you draw?
2. Assuming that two alcoholic drinks add a total of 20% to the thinking distance of a driver, work out the new total stopping distance if the driver had consumed these drinks. Plot your results on a graph.
3. How does alcohol affect the stopping distance? How does this differ with the speed of the car?
4. Explain why it is not advisable to drink alcohol before driving a car, or riding a motorcycle, moped or bicycle. How might this risk increase as the driver's BAC increases?
5. Why should pedestrians be careful about how much alcohol they drink?