

WHAT IS BAC (BLOOD ALCOHOL CONCENTRATION) ?

SCIENCE/ ENVIRONMENTAL STUDIES 14 - 16 WORKSHEET 8

When someone drinks alcohol it is absorbed into the bloodstream from the stomach and small intestine. The amount of alcohol in someone's blood is measured by their BAC (blood alcohol concentration).

BAC is usually measured as the number of milligrams (mg) of alcohol in 100 millilitres (ml) of blood. That's because a person's BAC depends on many different factors, for example:

- how many grammes of alcohol they have drunk (not how many drinks they have had)
- size and weight: a smaller person will have a higher BAC than a larger person drinking the same amount of alcohol.
- metabolic rate: which may change for the same person during the day, month or year
- general fitness
- emotional state
- the type of drink, e.g. alcohol in fizzy drinks tends to be absorbed more quickly
- the speed at which they drink
- whether they have eaten before they drink.

Gender is important too. Alcohol is distributed around the body in water, and females have less body water (and more body fat) than males. This means that, given the same amount of alcohol, and proportional to body weight, women will generally have a higher BAC than men.

ACTIVITY ONE

1. Using the formula given in the Worksheet 7, calculate the amount of alcohol (in grams) in each of the drinks below.

$$\frac{8 \times \text{volume of glass/bottle (ml)} \times \text{ABV* (\%)}}{1000}$$

(*ABV = alcohol by volume).

| Drink | Volume of glass/ bottle (ml) | ABV (%) |
|---------|------------------------------|---------|
| Lager | 330 ml bottle | 5 |
| Cider | 1/2 litre bottle (500 ml) | 9 |
| Wine | Half bottle (375 ml) | 12 |
| Spirits | 25 ml measure | 40 |

2. Assume that a healthy adult's liver can break down an average of 10g of alcohol per hour, all the alcohol consumed is absorbed into the bloodstream, and there are 4 litres of blood in the body. For each drink in the table, calculate how many grams of alcohol would be left in the bloodstream after 1, 2, 3, and 4 hours if an average healthy adult had drunk this drink. Record your results in a table.
3. Plot a line graph of your results. What conclusion can you draw?

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4. Now calculate the BAC after one hour for each of the drinks. Give your answer as the number of milligrams of alcohol in 100 millilitres (ml) of blood. Which drink results in the highest BAC?
5. Why is it difficult for a person to estimate their BAC?
6. Identify times when a person shouldn't drink - where an elevated BAC would affect their ability to carry out tasks accurately or could have other outcomes that make drinking unsafe.