



TALK ABOUT ALCOHOL

SCIENCE/
ENVIRONMENTAL
STUDIES
WORKSHEET 1

WHAT IS

ALCOHOL?

Alcohol is ethanol or ethyl alcohol. There are many informal names for alcohol (e.g. booze, bevv, drink), and there are many different types of alcoholic drink (e.g. beer, lager, wine, spirits, cider). But they all contain ethanol.

Ethanol is made from the sugar in grain or fruit and it is a colourless, clear liquid. The process used to make it is called fermentation.

FERMENTATION

Alcohol is formed when yeast feeds on sugar. Yeast is a one-cell fungus which reproduces by budding off new cells. This tiny organism grows and multiplies by feeding on sugar in foods such as grain and fruits. As the yeast feeds on the sugar, carbon dioxide and alcohol are produced. They are the waste products of the yeast's anaerobic respiration – that's respiration without oxygen.

sugar → **energy + alcohol + carbon dioxide**

$C_6H_{12}O_6$ → **energy + $2C_2H_5OH$ + $2CO_2$**

When yeast respire anaerobically, only a small amount of energy is released from the sugar and so most of the sugar stays in the alcohol. When the alcohol concentration reaches about 15% of alcohol by volume, the yeast cells die.

DIFFERENT

DRINKS

Alcohol is made by the fermentation of sugar in different fruits or grains. In wine making, yeast acts on the sugar in crushed grapes. Different types of grapes give different flavours to wines. In cider making, crushed apples are used. Beer is produced from malted grain – usually barley – to which hops have been added for flavour.

The amount of alcohol in drinks made by fermentation can be increased by distilling them. In this process, water and alcohol are separated by an evaporation process by boiling, which results in a stronger brew. Spirits (such as vodka, gin and whisky) are made in this way. Fortified wines (such as some sherries and port) add spirits to wine which results in a higher alcohol concentration of about 20%. Most spirits contain about 40% pure alcohol by volume.

ACTIVITY

ONE

In this experiment, you will investigate the conditions needed to produce alcohol by fermentation of apple juice.

Apparatus

- ▶ 4 test tubes
- ▶ two 250ml beakers
- ▶ cotton wool
- ▶ 50ml unsweetened apple juice
- ▶ 1 teaspoon dried yeast
- ▶ 1 teaspoon sugar
- ▶ marker pen or labels

Method

Set up four test tubes as shown in the diagrams.

Results

Record your results for the four test tubes in a table similar to the one below.

Tube number	Contents	Appearance after 1 week	Smell after 1 week	Was alcohol produced?

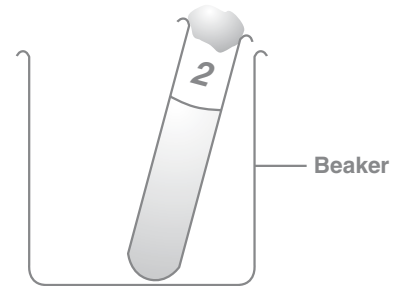
Conclusion

What conditions do you need to produce alcohol by fermentation of apple juice?

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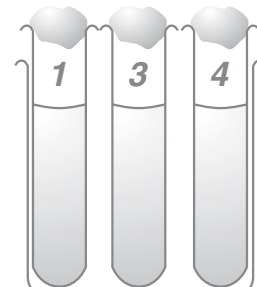
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ACTIVITY ONE



Fridge

1. Tube $\frac{3}{4}$ full of apple juice
Pinch of sugar
Pinch of dried yeast
Cotton wool plug on top
Leave in warm place for 1 week
with tubes 3 and 4



Warm

3. Tube $\frac{3}{4}$ full of apple juice
Pinch of sugar
Cotton wool plug on top
Leave in warm place for 1 week
with tubes 1 and 4