



TALK ABOUT ALCOHOL

SCIENCE/
ENVIRONMENTAL
STUDIES
WORKSHEET 5

INVESTIGATING THE DEHYDRATING EFFECTS OF ALCOHOL (14–16s)

About 60% of the mass of the adult human body is water. Our cells need plenty of water so the essential chemical reactions taking place inside them can work properly. In spite of how much water someone takes in each day, the water content of the body usually remains very stable. This is because hormones act on the kidneys and blood system to keep the balance right.

The most important of these is ADH, or anti-diuretic hormone. It is secreted by the pituitary gland and acts on the kidneys to reabsorb water. This means that body water is conserved and the amount leaving the body in urine is controlled.

Alcohol inhibits the secretion of ADH so the kidneys produce more urine and the body loses too much water. This is why alcohol has a dehydrating effect on the human body, and leads to the symptoms of a 'hangover' (e.g. feeling tired, thirsty and headachey).

The dehydrating properties of alcohol (ethanol) can be used to preserve biological specimens. The alcohol kills off decay-causing microbes by dehydrating them, so the specimens do not 'go off'.



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ACTIVITY

ONE

In this experiment, you will investigate the dehydrating effect of alcohol (ethanol) on living cells.

Safety note

An adult should supervise this experiment because ethanol catches fire easily. There must be no fires or naked flames in the room, and you shouldn't eat or drink while you are doing this experiment.

Apparatus

- ▶ 250ml beaker
- ▶ 100ml each of 10%, 20%, 30%, 40% ethanol
- ▶ large raw fresh potato
- ▶ white tile
- ▶ forceps or fork
- ▶ sharp knife
- ▶ cling film
- ▶ paper towel
- ▶ ruler

Method

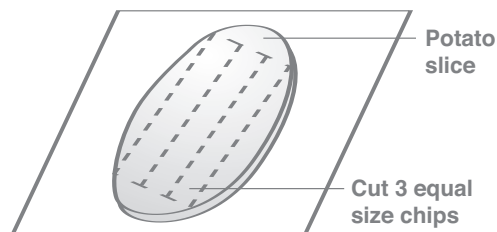
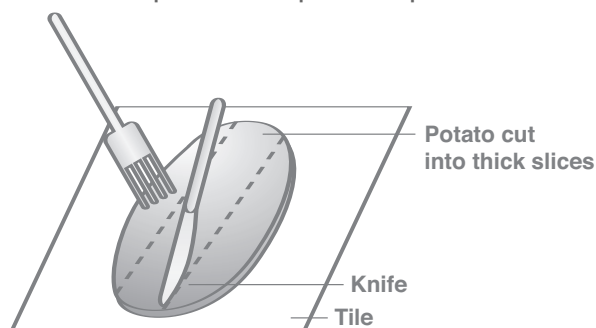
Follow the steps shown in the diagrams and record your results in a table similar to the one given.

ACTIVITY ONE

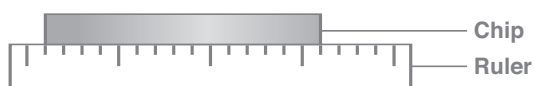
Investigating the dehydrating effects of alcohol (14–16s)

Follow these steps four times, using a different % concentration of ethanol each time.

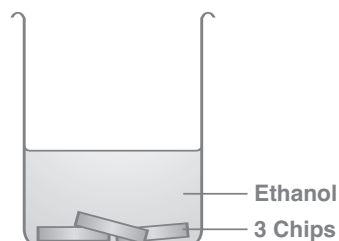
1. Assemble your apparatus.
2. Cut three potato chips of equal size.



3. Measure each chip with a ruler and record your results.



4. Put the ethanol and chips into the beaker.

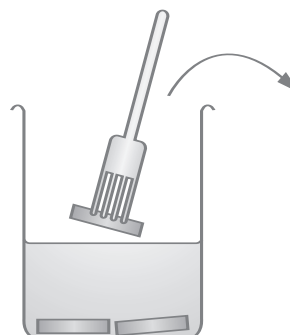


5. Ensure the chips are fully submerged, and cover the beaker tightly with cling film.



SAFETY!
ALCOHOL FUMES
CAN CATCH FIRE

6. After 24 hours, remove the chips from the alcohol and the beaker.

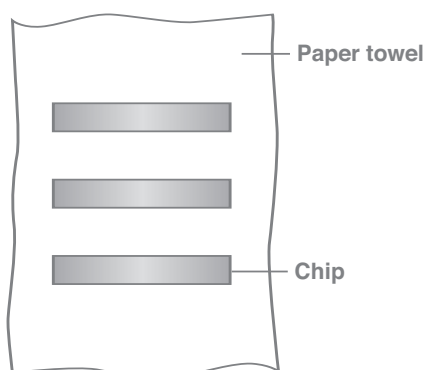


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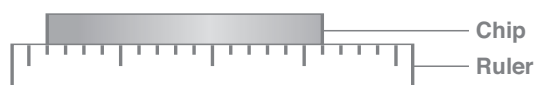
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7. Place the chips onto a paper towel.



8. Measure each chip again and record your results.



Results

Record your results for each percentage of ethanol in a table similar to the one below..

	Start of experiment		End of experiment		End result
Percentage (%) ethanol concentration	Length of each potato chip (mm) =	Average length of potato chips (mm) (add length of each of the 3 chips and divide by 3 to get the average) =	Length of each potato chip (mm) =	Average length of potato chips (mm) =	Change in average length of potato chips (mm) =

Conclusion

1. How does alcohol affect living cells?
2. How does the effect differ with different concentrations of alcohol?
3. Why is alcohol used to preserve biological specimens?
4. Why can drinking alcohol make someone feel thirsty afterwards?