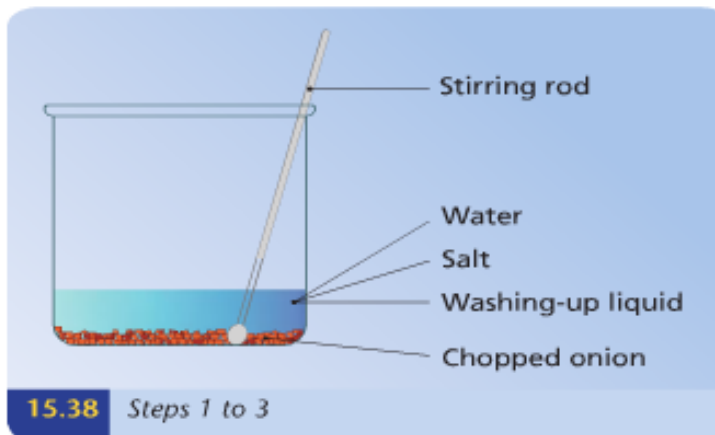


# 16 - DNA

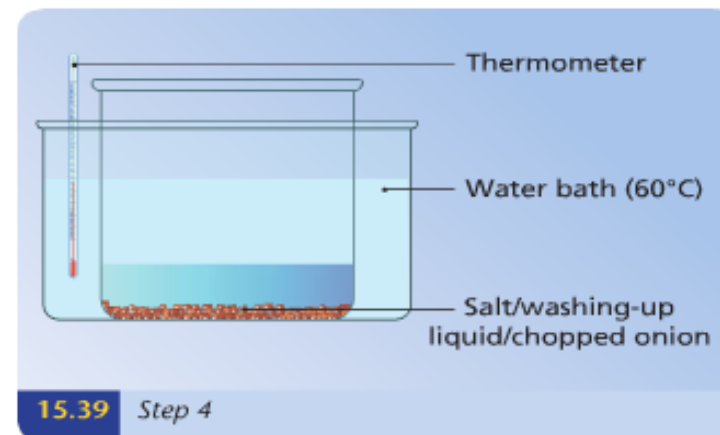
## Activity 15 To isolate DNA from a plant tissue

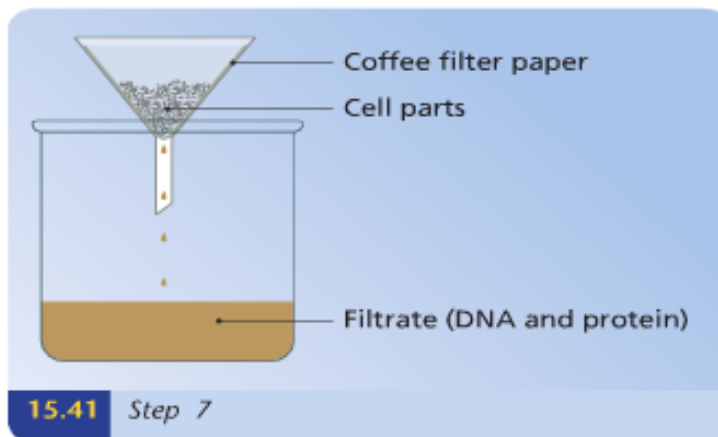
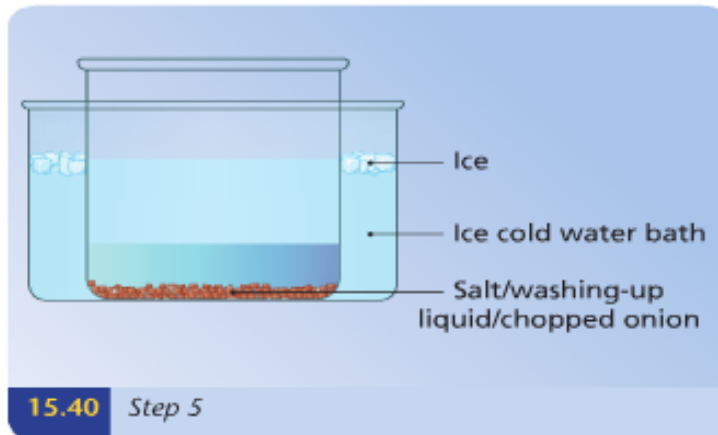
1. Add some sodium chloride (salt) to a small volume of washing-up liquid dissolved in water (the salt will cause the DNA molecules to clump together, and the washing-up liquid will dissolve the cell and nuclear membranes and release DNA from the cells).
2. Cut an onion (or kiwi fruit) into small cubes (this allows the washing-up liquid to reach more cells).
3. Add the chopped onion to a beaker containing the salt/detergent solution and stir the mixture.



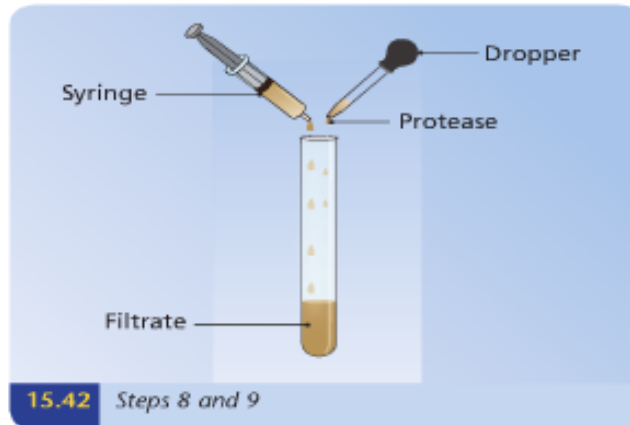
5. Cool the mixture by placing the beaker in an ice water bath for 5 minutes, stirring frequently (this slows down the breakdown of the DNA).

4. Put the beaker in a water bath at 60°C for 15 minutes. (This temperature inactivates (denatures) enzymes that would normally digest DNA. If left any longer than 15 minutes DNA itself would break down.)

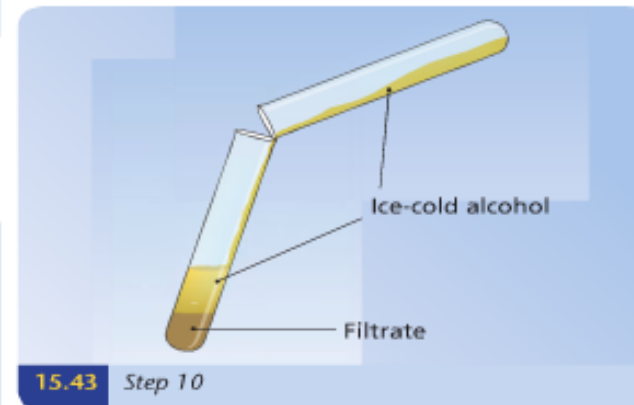
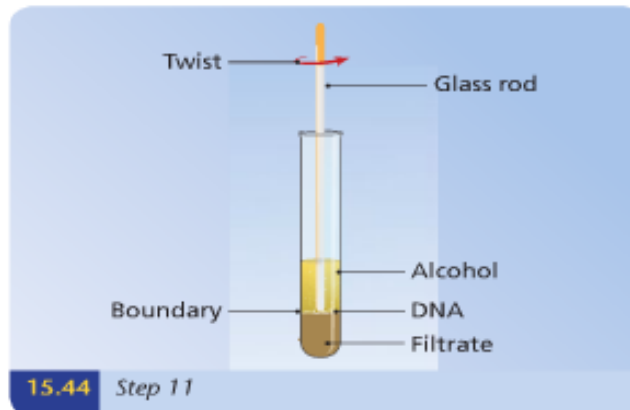




6. Pour the mixture into a domestic food blender and blend it for only 3 seconds on high speed. (This breaks down the cell walls and releases DNA. Blending it for too long would break down the DNA strands.)
7. Filter the mixture through coffee filter paper into a second beaker. Do not add the foam from the top of the mixture to the filter paper. (Cell parts are retained in the filter paper. The filtered material, called filtrate, contains DNA and proteins. Normal laboratory filter paper is not used as its pores are too small and the process would be very slow.)
8. Use a syringe, without a needle, to place some of the onion filtrate into a boiling tube.
9. Add a few drops of protease enzyme (such as pepsin) to the contents of the boiling tube and mix well (the protease breaks down the proteins around the DNA).



**10.** Pour some ice-cold ethanol or methylated spirits (stored in a freezer overnight) carefully down the side of the boiling tube. The ethanol should form a layer on top of the onion filtrate. (Alcohol removes water from DNA, which causes DNA to float to the top of the water. DNA is insoluble in ice-cold alcohol and so it precipitates at the alcohol-filtrate boundary. The DNA forms white threads at the alcohol-filtrate junction).



**11.** Gently twist a small glass rod or a wire loop in the alcohol. Strands of DNA should attach to the rod or wire. Do not mix the two layers or damage the DNA, which is very easily broken (DNA forms a clear mesh of what looks like stringy mucus, as shown in diagram 15.4 on page 171).