

DNA is often obtained from mouth swabs or from samples of blood, hair, or plants. Before technicians from a crime or genetics laboratory can conduct their analysis, they must first isolate the DNA and remove it from the sample. In this activity, you will perform this first step in DNA analysis.

### Safety



- Do not eat or drink anything during this activity. Do not put your hands near your face.
- Handle rubbing alcohol or ethanol with care. Both are poisonous.
- Wash your hands thoroughly after this investigation.

### Materials

- 1 frozen strawberry
- a small, resealable plastic bag
- measuring spoons
- 5 mL dish soap
- 2.5 mL table salt
- 25 mL tap water, approximately
- test tube and test tube rack
- flask containing rubbing alcohol or ethanol (ice cold)
- graduated cylinder
- wooden stick or paper clip hook
- paper towel

### What to Do

1. Place the frozen strawberry into the plastic bag. Add 5 mL of dish soap, 2.5 mL of table salt, and about 25 mL of tap water. Seal the bag.
2. Gently crush the contents of the plastic bag with your hand so that the strawberry and other substances combine. Be careful not to damage the plastic bag.
3. Keep the bag at room temperature and wait for 5 min.
4. Cut a small hole in one corner of the plastic bag, and carefully drain about half of the strawberry solution into a test tube, filling it halfway.
5. Pour the ice cold rubbing alcohol or ethanol from the flask into the graduated cylinder. Then slowly pour a layer of rubbing alcohol or ethanol on top of the strawberry solution so that the test tube is about  $\frac{3}{4}$  full.
6. Observe the DNA forming between the layers of alcohol and strawberry solution.
7. Using a wooden stick or paper clip hook, pull the DNA out and onto a paper towel. Record your observations.
8. Clean up and put away the equipment you have used. Dispose of the alcohol and strawberry solution as your teacher instructs.
9. Wash your hands thoroughly.

### What Did You Find Out?

1. (a) Describe the appearance of the DNA.  
(b) Did the DNA look as you expected? Explain.
2. Do you think the DNA from another organism would have a different appearance? Explain why or why not.
3. Why do you think it was necessary to crush the strawberry in this activity?
4. What step was necessary to make the DNA visible?
5. If you wanted to maximize the amount of DNA that came out of the strawberry, which ingredient might you increase?

### Station 3 - Chromatography

#### Procedure for Station 3

1. On a piece of chromatograph paper, use the black overhead projection pen to mark a "blob" about 2 cm. from the bottom of the paper.
2. Place enough water in a large test tube so the when the paper is inserted, the level of the water will be above the bottom of the paper but just below the black mark. Place the paper in the test tube so that it's bottom edge (but not the black mark) is immersed in water. Watch what happens as the water is soaked up into the paper.
3. On the Left half of the space right below, draw a simple diagram of the apparatus labeling the paper, ink mark and water just after the paper is inserted. Label as "Before".

4. After about 5 minutes draw a diagram of the apparatus and how it looks. Do it on the right half of the space just above. Label as "After". Use coloured pencils or pens to show colours in your diagram.
5. Take the paper out and let it dry so you can **staple or glue it into your lab report.** Rinse out the test tube and leave it in the clamp.
6. Attempt radial chromatograph!! Use mixture of food colouring and try again!

#### Questions for Station 3

1. Is the black ink a pure substance or a mixture? \_\_\_\_\_
2. What is the solvent in this experiment? \_\_\_\_\_
3. Give a tentative explanation (hypothesis) of how the colours in the original ink are separated.

4. Suggest mixtures other than ink which might be easy to separate using paper chromatography.
5. Is this process best for small amounts or for large amounts of a sample to be separated? \_\_\_\_\_