

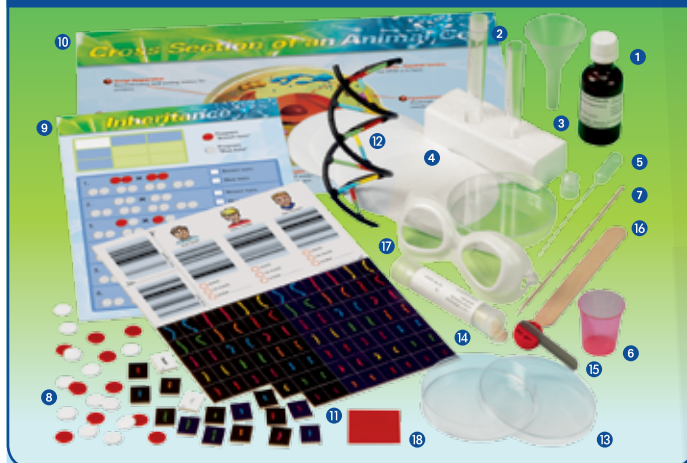
# GENETICS & DNA



**WARNING:** Only for use by children over 10 years old. To be used solely under the strict supervision of adults who have studied the precautions given in the experimental set. Contains some chemicals which are classified as safety hazards. Read the instructions before use, follow them, and keep them for reference. Do not allow chemicals to come into contact with any part of the body, particularly mouth and eyes. Keep young children and pets away from experiments. Store the chemistry set out of reach of young children. Eye protection for supervising adults is not included.

**WARNING** — Science Education Set. This set contains chemicals and/or parts that may be harmful if misused. Read cautions on individual containers and in manual carefully. Not to be used by children except under adult supervision.

## What's in your experiment kit:



## Additional things you will need:

*Denatured alcohol (methylated spirits), table salt, dish washing liquid, teaspoon, 2 yogurt containers, ruler, felt-tip pens, knife, scissors, permanent marker, plastic wrap, hand blender, tomato, jelly jar, microwave*

## Checklist: Find – Inspect – Check off

✓	No.	Description	Qty.	Item No.
<input type="checkbox"/>	1	Empty brown glass bottle with lid	1	772093
<input type="checkbox"/>	2	Test tube with stopper	2	772100
<input type="checkbox"/>	3	Funnel	1	086228
<input type="checkbox"/>	4	Filter paper sheet	10	772092
<input type="checkbox"/>	5	Pipette	1	232134
<input type="checkbox"/>	6	Measuring cup	1	065099
<input type="checkbox"/>	7	Wooden skewer	1	020042
<input type="checkbox"/>	8	White and red plastic chips	12	705818
<input type="checkbox"/>	9	Inheritance worksheet	1	705897
<input type="checkbox"/>	10	Cell poster	1	705820
<input type="checkbox"/>	11	Chromosome puzzle and genetic fingerprinting cards	1	705819
<input type="checkbox"/>	12	DNA model	1	705817
<input type="checkbox"/>	13	Petri dish	2	702184
<input type="checkbox"/>	14	LB agar	1	705815
<input type="checkbox"/>	15	Lid opener	1	070177
<input type="checkbox"/>	16	Wooden spatula	1	000239
<input type="checkbox"/>	17	Safety goggles	1	052297
<input type="checkbox"/>	18	Red decoder film	1	161415

Any materials not contained in the kit are marked in *italic script* in the “You will need” boxes.

→ Before doing anything else, please check all the parts against the list to make sure that nothing is missing.

→ If you are missing any parts, please contact Thames & Kosmos customer service.

### Isolating Genetic Material Pages 5 to 11

Find the DNA in a tomato



### Decoding the Structure of DNA Pages 26 to 35

Crack the code of  
the double helix



### The DNA Evidence Solves the Crime Pages 36 to 40

Learn how forensic scientists  
use DNA fingerprinting

### Heredity: Investigating Traits Pages 12 to 18

Learn how traits  
are passed from  
parents to children



### The Age of Genetic Engineering Pages 41 to 46

Grow a bacteria colony  
to learn about genetic  
engineering



### Cells and Chromosomes Pages 19 to 25

Find out  
where the DNA  
is located in our  
bodies



### Answers Pages 47



### CHECK IT OUT

You will find supplemental  
information on pages 6, 11,  
12, 19, 21, 22, 25, 30, 33, 37, 38,  
40, 42, and 46.

## Further preparation for isolating DNA

### YOU WILL NEED

- tomato-soap mixture from Experiment 1
- test tube
- test tube holder from polystyrene kit tray
- funnel
- filter paper
- ruler
- *permanent marker*

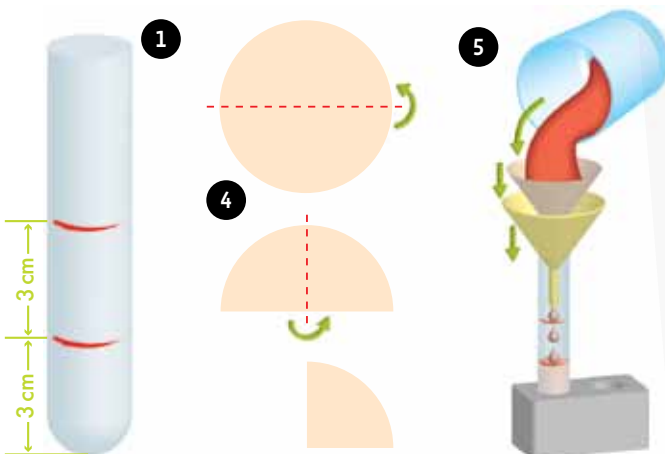
Researchers often use a filter to get a clear solution from a cloudy one. For the next experiment, we will need a specific quantity of liquid.

### HERE'S HOW

1. Use the ruler to measure three centimeters from the bottom of the test tube,

and mark that distance by drawing a line with the permanent marker. Then, mark another line three centimeters above that. This will help us filter the right amount of liquid.

2. Next, you will need a holder for the test tube. Carefully separate the block with the two holes in it from the polystyrene parts tray in your kit.
3. Set the test tube in one of the holes and place the funnel in the test tube.
4. Fold the filter paper as shown in the illustration below and insert it in the funnel. If you run out of filter paper for later experiments, you can just cut a regular coffee filter so that it fits into the funnel.
5. Gradually pour the tomato-soap mush (from Experiment 1) in small portions onto the filter. It will take a while for clear liquid to fall, drop by drop, into the test tube.
6. Keep adding the mush until the liquid in the test tube reaches the first mark. It might take up to ten minutes. Be patient.



### TIP

On the topic of patience: All scientists must be patient. Some larger experiments last for weeks or months, and sometimes they fail and have to be repeated all over again.

# The criminal profile

## YOU WILL NEED

→ genetic fingerprinting sheet

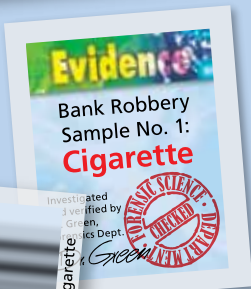
## HERE'S HOW

Dr. Green printed out his results here. You can see a set of genetic fingerprints. Figure out which two people match the genetic fingerprints taken from the cigarette and the traces of blood, and which people apparently had nothing to do with the robbery.



Larry Smith	Katherine Little	Hank Schubert
<input type="radio"/> no match <input type="radio"/> match sample:.....	<input type="radio"/> no match <input type="radio"/> match sample:.....	<input type="radio"/> no match <input type="radio"/> match sample:.....

Anna Baldwin	Connie Lee	Martin Adler
<input type="radio"/> no match <input type="radio"/> match sample:.....	<input type="radio"/> no match <input type="radio"/> match sample:.....	<input type="radio"/> no match <input type="radio"/> match sample:.....



Schubert's sample from this morning precisely matches the pattern from the blood sample. Adler's matches the sample from the cigarette butt. "But Rudy was there too!" is Hank Schubert's furious remark. "Thanks, gentlemen," interjects Commissioner Reddy, "You can give me that exact statement for the official record in the room next door."

