EXPERIMENT MANUAL

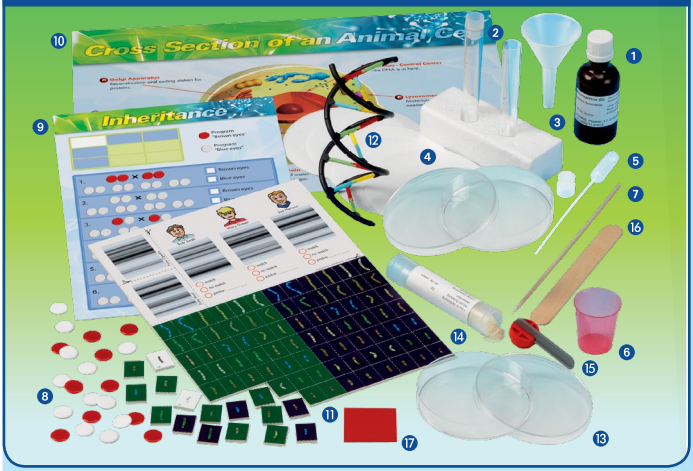
# GENETICS & DNA

**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.

**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.

THAMES & KOSMOS

## 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. |
|---|---|---|---|---|
| ☐ | 1 | Empty brown glass bottle with lid | 1 | 772093 |
| ☐ | 2 | Test tube with stopper | 2 | 772100 |
| ☐ | 3 | Funnel | 1 | 086228 |
| ☐ | 4 | Filter paper sheet | 10 | 772092 |
| ☐ | 5 | Pipette | 1 | 232134 |
| ☐ | 6 | Measuring cup | 1 | 065099 |
| ☐ | 7 | Wooden skewer | 1 | 020042 |
| ☐ | 8 | White and red plastic chips | 12 | 705818 |
| ☐ | 9 | Inheritance worksheet | 1 | 705897 |
| ☐ | 10 | Cell poster | 1 | 705820 |
| ☐ | 11 | Chromosome puzzle and genetic fingerprinting cards | 1 | 705819 |
| ☐ | 12 | DNA model | 1 | 705817 |
| ☐ | 13 | Petri dish | 2 | 702184 |
| ☐ | 14 | LB agar | 1 | 705815 |
| ☐ | 15 | Lid opener | 1 | 070177 |
| ☐ | 16 | Wooden spatula | 1 | 000239 |
| ☐ | 17 | 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.

CONTENTS



## 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.

EXPERIMENT 7

## → WHAT'S HAPPENING?

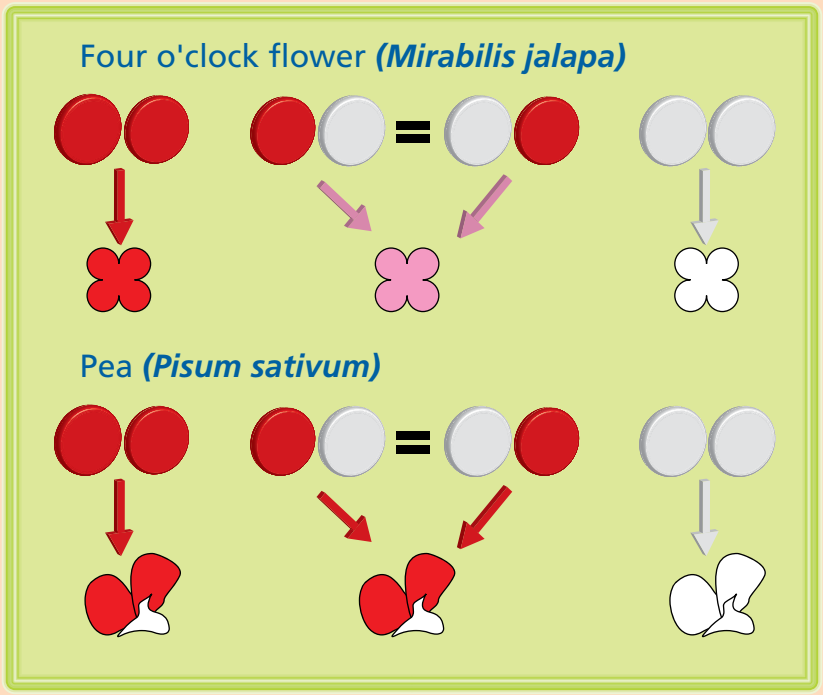
These are the possibilities:

a) If the programs complement each other equally, one program for red plus one for white would make pink flowers. This is what happens, for example, with the four o'clock flower, Mirabilis jalapa. One of these plants with a mixture of red and white programs does in fact have pink flowers.

b) But it is also possible for one program to dominate the other: for example, for the red program to prevail against the white program, so that the offspring plant has only red flowers even if both red and white programs are present. That is exactly how Mendel's peas behaved.


Pea


Four o'clock flower



# How features are passed on

## YOU WILL NEED

→ colored plastic chips

The way that features were distributed was still unclear to Mendel. But on this topic, he had a few more ideas. After all his experiments, it suddenly became clear as day to him that each partner only passes on one copy of each program to the offspring and not all the copies. That makes sense, because otherwise the number of programs would double with each generation.

Luckily, it is much more orderly than that: Only one of two possible programs passes from the parents to the children — so each of the offspring logically ends up with two copies again.

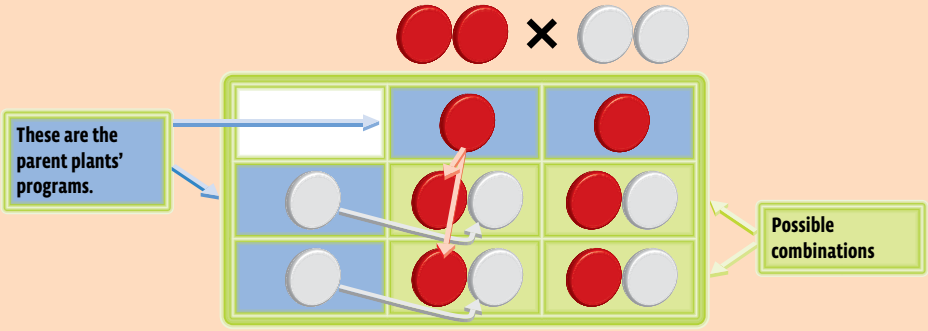
Now we can explain which four combinations of the programs can arise from two different pea plants when they are crossed.

## HERE'S HOW

1. For the first pea plant breeding exercise, one pea should have two programs for red, and the other should have two for white. By placing the colored chips in the grid drawing below, you can easily figure out all possible combinations.

2. In each case, one program from one parent is crossed with one program from the other.

   Because we are dealing with peas here, all the offspring are red, since the program for red color always dominates. Not a trace of white to be seen — at least, not from the outside, by looking at the flower color.




**The X indicates that pea plant 1 (red-red) is crossed with pea plant 2 (white-white). From that crossing, we get four possible pea plant offspring, all with red flowers.**