

A Chromosomal Study

In this activity, you will create a karyotype from a page of mixed chromosomes. Karyotypes are created by matching homologous pairs and numbering them from largest to smallest. Abnormalities, such as extra or deleted chromosomes can then be diagnosed. Pictured chromosomes will be used for this model rather than real chromosomes, but the process is the same for real chromosomes extracted from cell or fetal samples.

These chromosomes are actually enlarged photographs of what is seen through a microscope. Note that the sex chromosomes have been labeled for you as either X or Y chromosomes. They have been marked this way to indicate these are the sex chromosomes. Cut out each chromosome with scissors, to make it go faster, cut them out as squares rather than trying to cut around the margin of each chromosome.

Prepare a karyotype of these chromosomes. A karyotype is a pattern or picture of chromosomes from one cell grouped into pairs and organized by size.

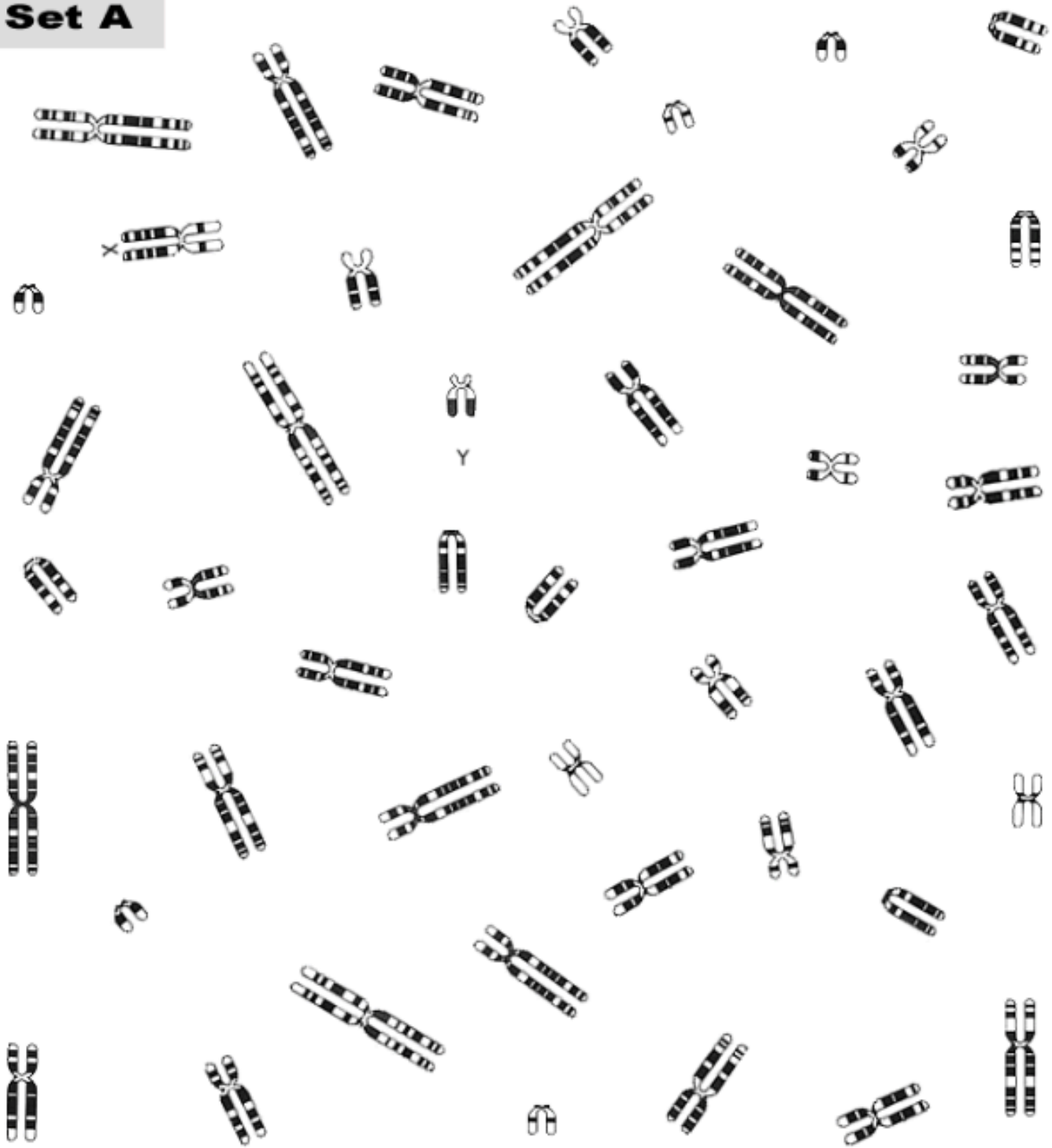
- Pair up each of the chromosomes with its homologous pair, use the size and markings on the chromosomes to determine pairs. Temporarily put the two unshaded chromosomes aside.
- On a blank paper, arrange the chromosome pairs from largest to smallest and number them. Your numbers should range from 1 (largest) to 22 (smallest). Put the sex chromosomes last, this is pair #23. Glue or tape the chromosomes to the paper in the correct order.

Sex chromosomes determine the sex of the individual. A female develops when the sex chromosomes match -XX. A male develops if the two sex chromosomes are unmatched -XY. (These chromosomes are unshaded on your karyotype)

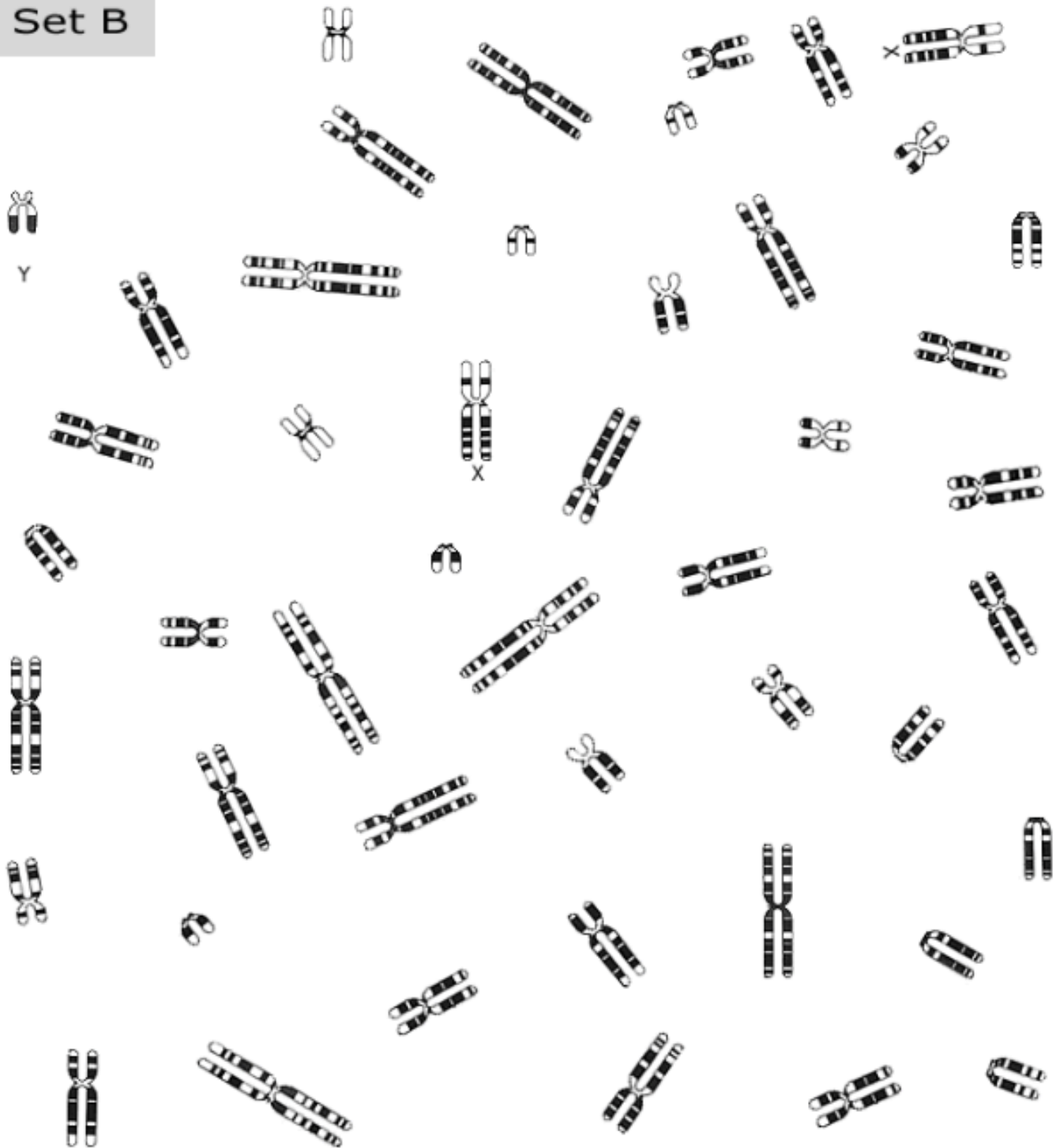
Analysis

1. How many total chromosomes are present in this karyotype? _____
2. How many chromosomes are present in each cell of this human? _____
3. Does your karyotype represent a male or a female? _____
4. Chromosomes that are NOT sex chromosomes are called autosomes. How many total autosomes are present in your normal karyotype? _____
5. Does your karyotype represent an individual with a disorder? If yes, list the disorder.
If no, list 'normal.' _____

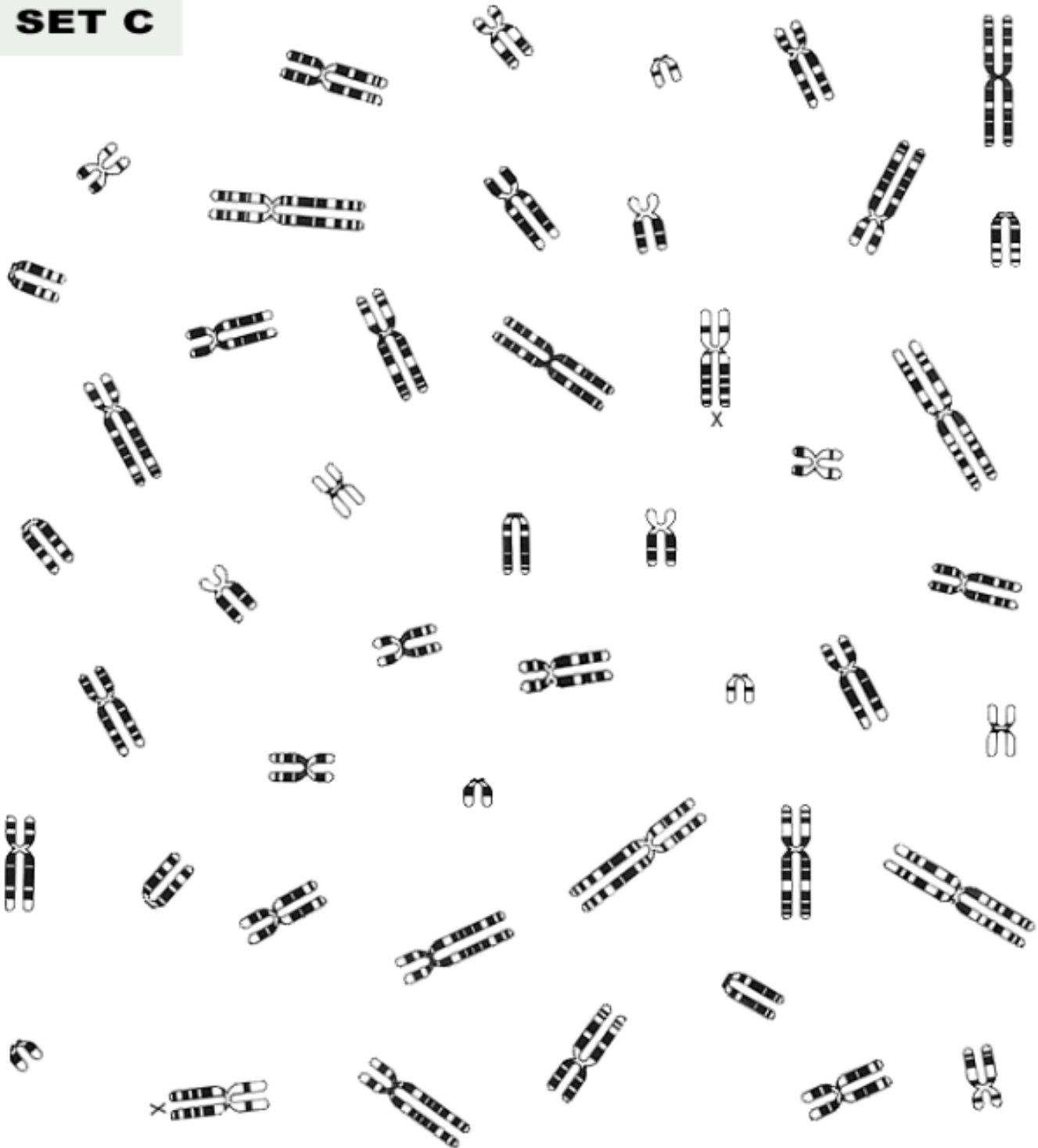
Set A



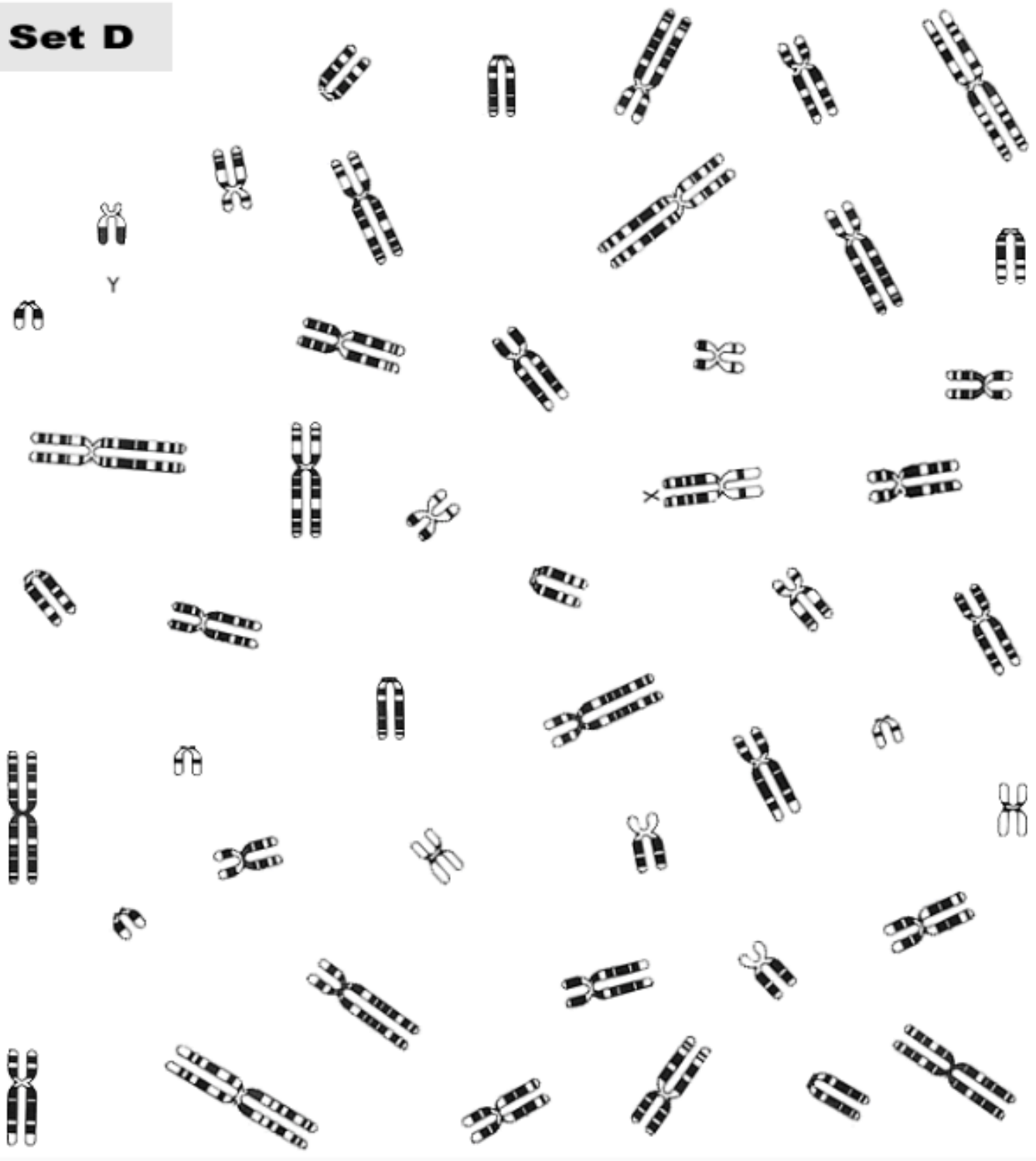
Set B



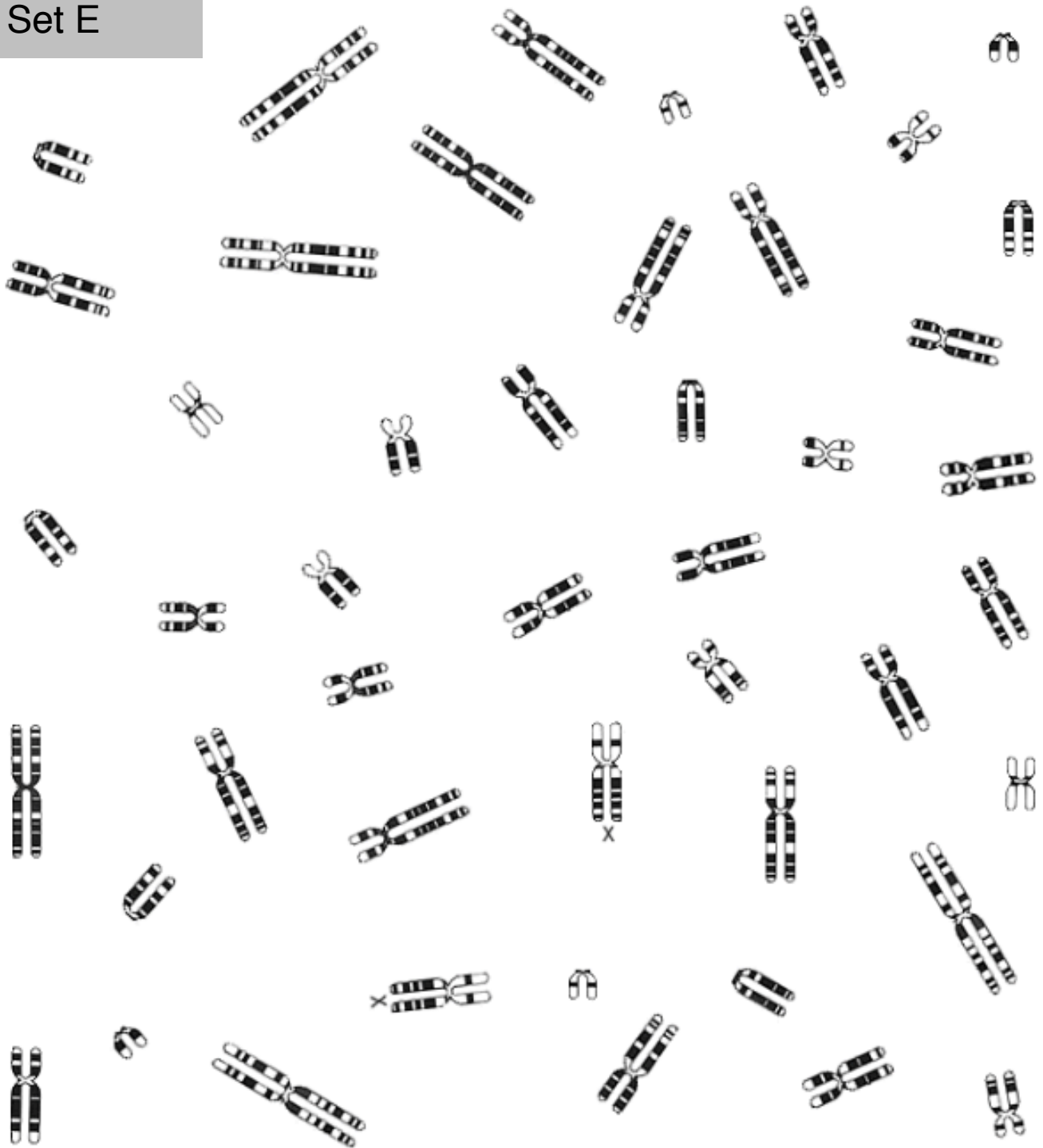
SET C



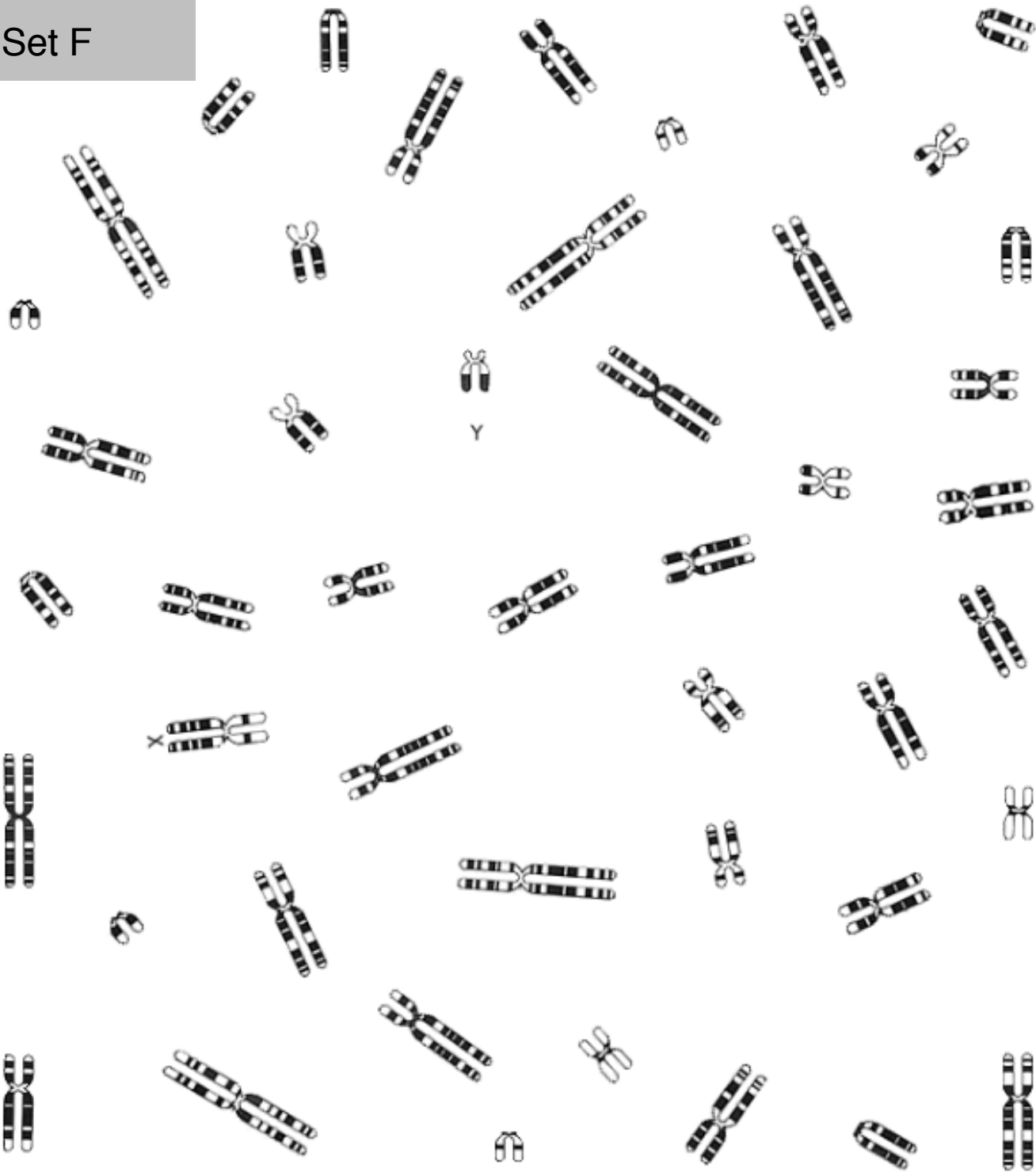
Set D



Set E



Set F



Teacher Key:

Set	Disorder
A	Down Syndrome
B	Klinefelter's
C	Down Syndrome
D	Patau Syndrome
E	Normal Female
F	Normal Male