

This is the **Higher Combined** version — includes Higher Tier content. Some Separate-only details are omitted.

In humans, biological sex is determined by a pair of sex chromosomes — one inherited from each parent.

- Females have two X chromosomes: XX.
- Males have one X and one Y chromosome: XY.
- Eggs all carry an X chromosome. Sperm carry either X or Y.
- If X sperm fertilises egg → XX → female. If Y sperm fertilises egg → XY → male.
- Probability of each sex: 50% male, 50% female in each pregnancy (independent of previous children).
- ★ **HT** The Y chromosome carries the SRY gene — triggers male development. Without it, female development occurs by default.
- ★ **HT** Sex-linked characteristics: genes on the X chromosome (not Y). E.g. red-green colour blindness, haemophilia. More common in males (only need one copy on X; males have no second X to mask it).

Key Terms

Sex chromosomes	The pair of chromosomes determining biological sex — XX (female) or XY (male)
Sex-linked	A trait whose gene is located on the X chromosome — males more likely to be affected by recessive sex-linked conditions
Haemophilia	Sex-linked recessive condition — blood fails to clot properly — gene on X chromosome

■ **Exam Tip:** In a Punnett square for sex determination: show X ■ X ■ (mother — all eggs carry X) on one side and X Y (father — sperm carry X or Y) on the other. All four boxes: XX, XX, XY, XY → 50:50 ratio.