

“Y” You’re a Guy—Genetics and Sex Determination Worksheet

“Boy or a girl?” You’ve probably heard people ask a pregnant woman that question. Did you wonder how babies get to be boys or girls, or why we can’t “put in an order” for one or the other? Use the materials at this center to complete the worksheet and find out.

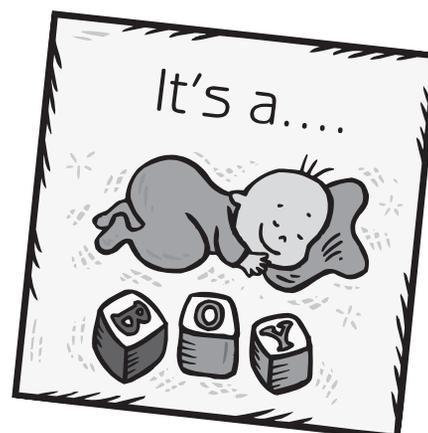
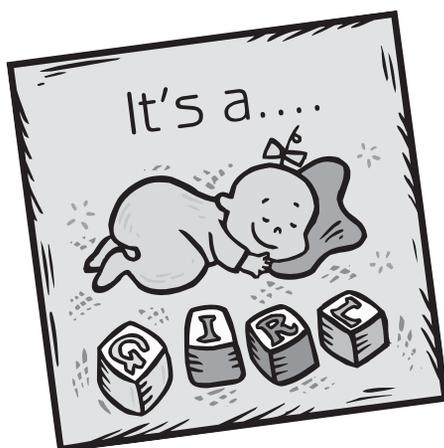
1. Put these parts of cells from the human body in order, from biggest to smallest:

Gene Nucleus DNA Chromosome
_____ _____ _____ _____

2. How many chromosome pairs do most human cells have? _____
3. Our chromosomes are in pairs because we get half our genetic makeup from our _____ and half from our _____.
4. Human cells that have only 23 chromosomes (not pairs), and can join together to create a new person, are called _____. Sex cells from the mother are _____ and the sex cells from the father are _____.
5. Almost all chromosomes from the egg and the sperm look alike, with an X shape. All 23 chromosomes in the egg have an X shape. But the sperm might have either all X shaped chromosomes or 22 X shaped and one Y shaped chromosome. Whether that 23rd chromosome is X or Y shaped is what determines whether the baby created from that egg and sperm will be a _____ or a _____.
6. Babies that grow from a mother’s X chromosomes and a father’s sperm with all X chromosomes (XX) are _____. Babies that grow from a mother’s X chromosomes and a father’s sperm with a Y chromosome (XY) are _____.
7. Which parent’s sex cell makes the baby a boy or a girl? _____
8. Half of a father’s sperm have all X chromosomes; half have a Y chromosome. So why doesn’t every family have equal numbers of sons and daughters? Some families have all girls; some all boys; some a mix. The answer is that it’s a matter of chance which sperm and egg join to make babies. Use the marbles in the containers to try an experiment that shows chance at work. Follow these steps:

- Solid marbles are X chromosomes; cat's eyes are Y chromosomes. The container with all solid marbles represents the mother's eggs with all X chromosomes. The container with half solid and half cat's eye marbles represents the father's sperm, half of which are all X and the other half with a Y chromosome. Fill in the blanks: Container #1 represents _____. Container #2 represents _____.
- Imagine you're an adult. You and your spouse want four children. Will you have daughters or sons? Close your eyes and draw a marble out of each container. Open your eyes. Is your first child a boy or girl? Fill in the chart below. Repeat the process three more times.
- Answer this question. If twenty-five students do this experiment and you combine your results to show one hundred chromosome pairings, how many boys and girls would you expect to have? _____.

Child	Chromosome pair (XX or XY)	Girl or Boy?
#1		
#2		
#3		
#4		



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Answer Key

1. Nucleus, Chromosome, Gene, DNA
2. 23
3. Fathers, mothers (either order)
4. Sex cells, eggs, sperm
5. Girl, boy (either order)
6. Girls, boys
7. The father’s
8. The mother’s eggs, the father’s sperm
(Experimental process; chart filled in with results)
50 of each