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Topic: Reproduction & Genetic Variation Worksheet

Summary: Students answer questions on meiosis, asexual/sexual reproduction, fertilization, karyotypes, and genetic variation.

Goals & Objectives: Students will be able to describe the formation of gametes and the main causes of genetic variation.

NGSS Standards: *HS-LS3-2.* Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

Time Length: 20 minutes

Materials:

Class notes or textbook or online textbook:

- <https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/2.38/primary/lesson/genetic-variation-bio/>
- <https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/2.36/primary/lesson/meiosis-bio/>
- <https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/2.35/primary/lesson/asexual-vs.-sexual-reproduction-bio/>

Procedures:

1. Tell the students which section they are to use in the textbook. Students are then going to read the section and answer the questions on the worksheet.

Accommodations: Students who cannot read at a high school level can be shown pictures in the book that help explain the answer. Students with an IEP can take the handout home if they need extra time.

Editable DOCX File and Answer Key:

Available at www.ngsslifescience.com

Reproduction & Genetic Variation WS

Sexual Reproduction

1. What is genetic variation? _____
 2. How many parents do sexually reproducing organisms have? _____
 3. A main benefits of having parents that are genetically _____ is that there is no chance on the offspring having the same DNA as their parents; hence increasing genetic _____.
 4. How does the random fusion of egg and sperm increase genetic variation? _____
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Meiosis

5. Meiosis results in cells with _____ the number of chromosomes as the parent cell.
 6. In animals, what two organs have specialized cells that perform meiosis?

 7. In *what kind of cells* will a mutation in the genetic code be passed on?

 8. What are the two types of animal gamete cells? _____

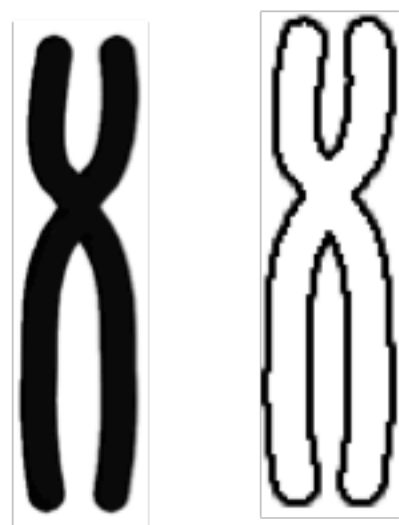
 9. Spermatogenesis results in how many functional sperm? _____
 10. Oogenesis results in _____ functional egg(s) and 3 polar bodies.
 11. Why does crossing over cause genetic variation? _____
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12. When does crossing over happen? _____
13. Draw the stages of crossing over using the two homologous chromosomes.

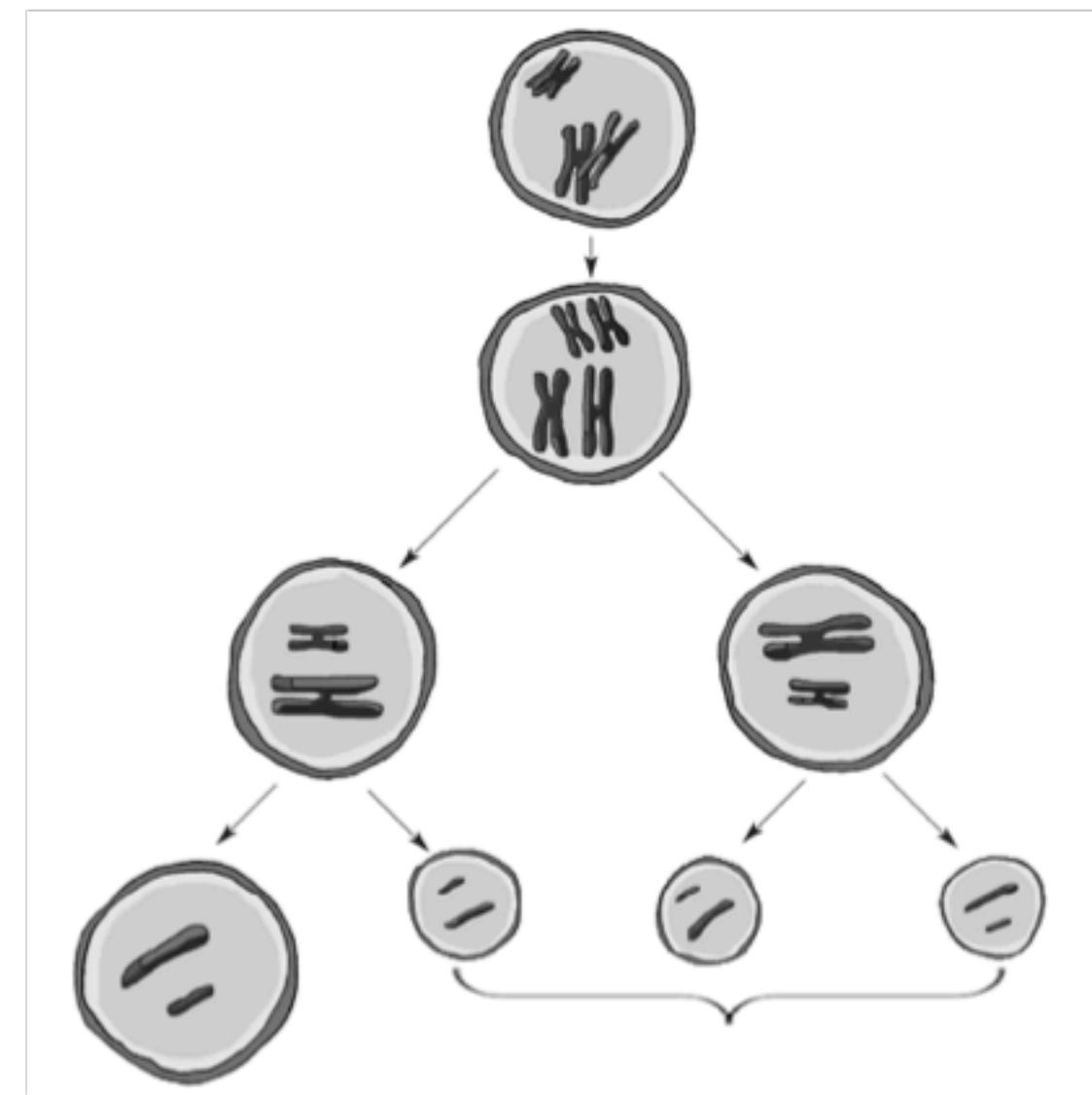
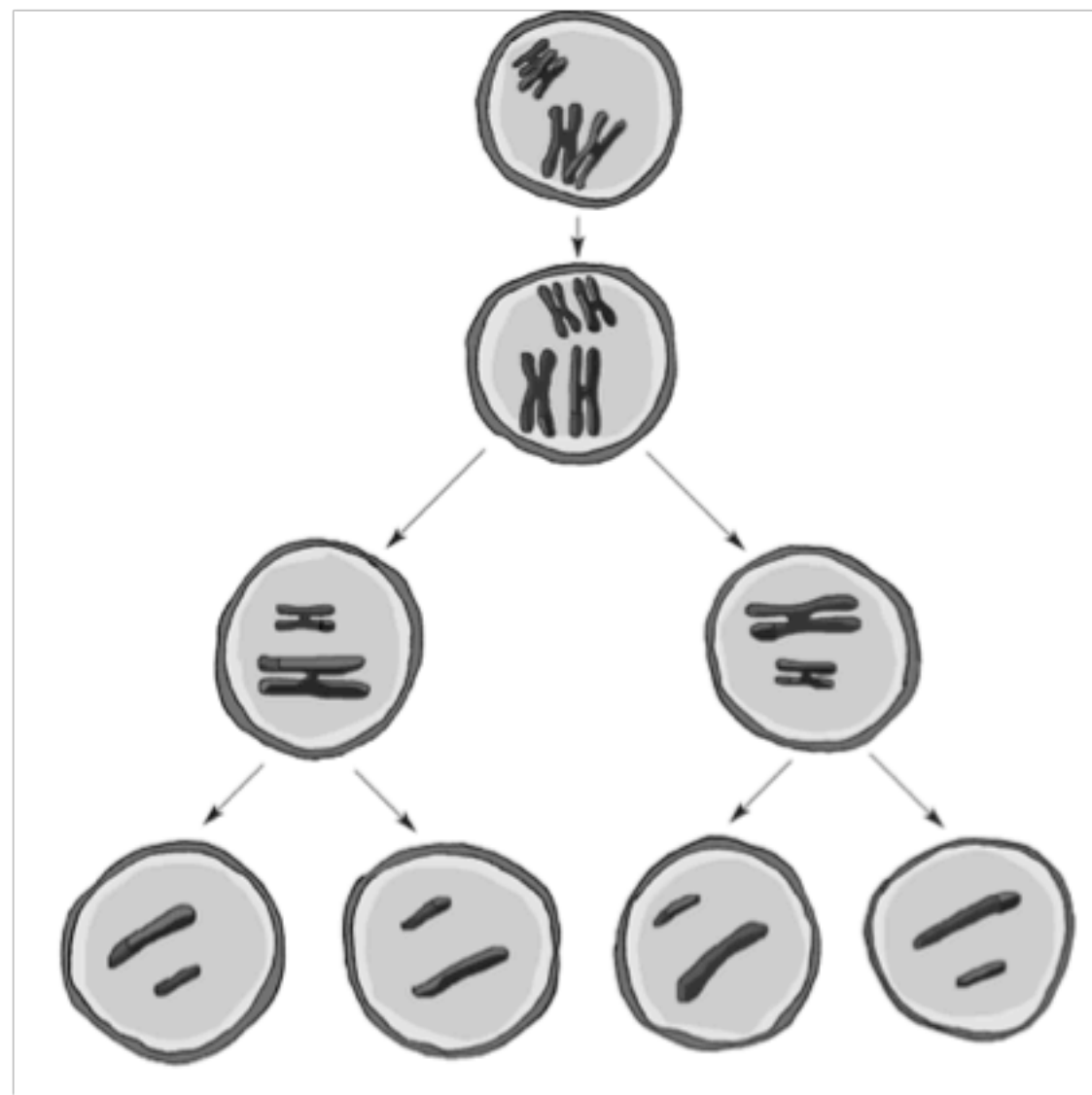
Before

Crossing Over

After



14. Label the two processes below with sperm, ovum, polar bodies, spermatogenesis, oogenesis, and crossing over.



Fertilization and n Value

15. n equals how many sets of chromosomes? _____
16. $2n$ equals how many sets of chromosomes? _____
17. When a sperm fuses with an egg, what is created? _____
18. Write in the n value for the following equation. $\underline{\quad n \quad}$ sperm + $\underline{\quad n \quad}$ egg = $\underline{\quad n \quad}$ zygote
19. How many chromosomes are in human haploid gametes? _____

Karyotypes

20. Using the karyotype, circle the gender of this individual and write the gender next to it. Perform nondisjunction by drawing in a 3rd chromosome to create Down syndrome.

