

Name: \_\_\_\_\_

Unit 7: Heredity & Genetics

NOTES 7.01

**FOCUS:** Sexual & Asexual Reproduction

**EQ:**

- Can you explain the difference between sexual and asexual reproduction?
- Can you give some examples of organisms that reproduce asexually and describe the process?
- Can you give some examples of organisms that reproduce sexually and describe the process?
- What is the advantage to a species of reproducing sexually versus asexually?
- Can you explain the difference between mitosis and meiosis and describe when each is used?

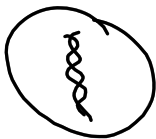
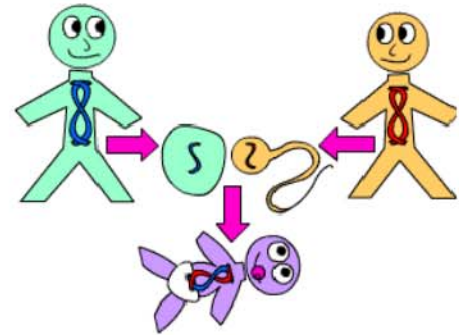
**Reproduction**

- All living things pass genetic information on to the next generation through the process of reproduction.

- Reproduction can happen in two ways:

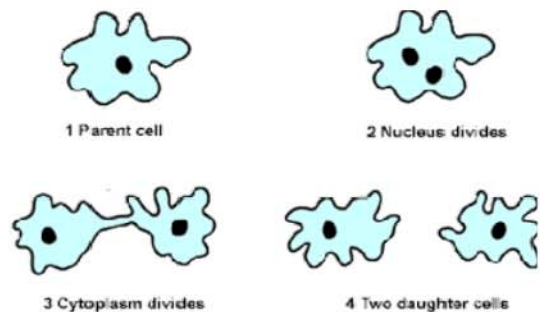
**1. Sexual reproduction:**

- Sex means "to cross"
- Occurs when genes from 2 parents cross.
- Offspring contains a mixture of genetic information from both parents.
- Offspring is genetically unique (different from both parents).



**2. Asexual reproduction:**

- Asexual means "NOT to cross"
- Occurs when the genes from only one parent are passed on to an identical offspring.
- Offspring is a genetic clone of the parent.



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Asexual Reproduction

Five types:

1. Binary Fission: <sup>two</sup> <sup>split</sup>

Growth and splitting of an organism into two organisms

- Ex: Bacteria  
Protists



2. Budding: Rapid cell division  
(mitosis & cytokinesis)  
creates a "bud" off the side of an organism

- The bud develops into an identical, but smaller version of the parent.
- When it's large enough, it breaks off and becomes independent of the parent.

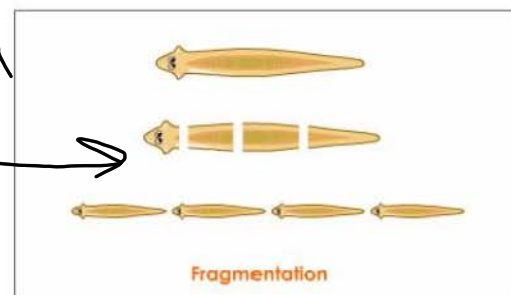
- Ex: Hydra, jellyfish, coral, yeast

Hydra



3. Fragmentation: A new organism grows from a piece of the parent organism

- Ex: starfish, Planaria



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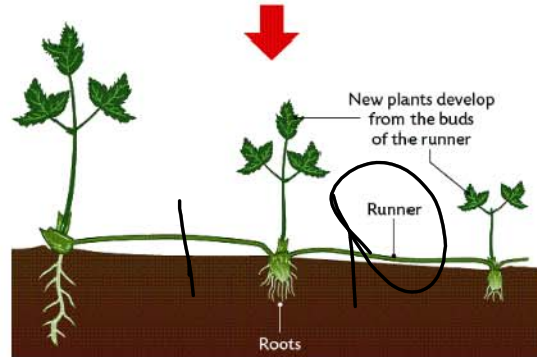
4. Vegetative Propagation : New plants are produced from a

cut ← cutting or runner of the parent plant

▪ Made possible by rapid cell division

(mitosis & cytokinesis)

▪ Ex: strawberries, potatoes, bulbs



5. Parthenogenesis : Eggs turn directly into offspring without fertilization

○ AKA -

"Virgin birth"

○ Ex:

Fish, lizards, and insects



especially in difficult environmental conditions.

Komodo Dragon

• Advantages:

- No genetic change is good if the environment is stable.
- All individuals within the species are capable of producing offspring.
- Energy is conserved since it does not have to be spent seeking a mate.
- Occurs quickly and efficiently.

• Disadvantages:

- No recombination of genes = No genetic diversity
- Weaknesses in the parent generation are passed on to the new generation.
- Leaves an entire generation susceptible to extinction.

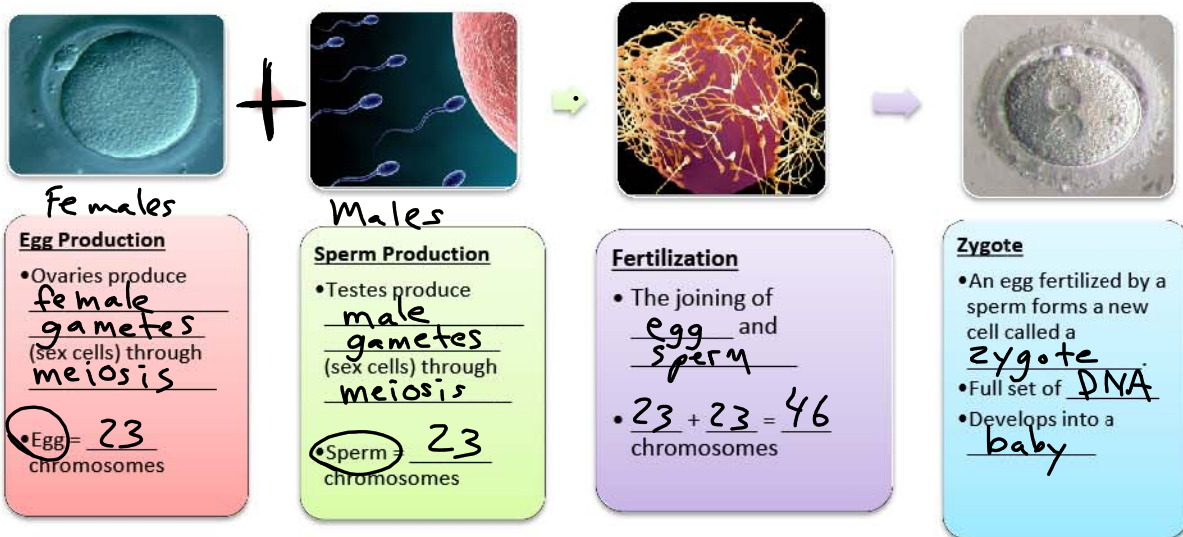
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### Sexual Reproduction

- Male parent provides half the genes and female parent provides the other half.
- Occurs through the process of fertilization in which two sex cells (gametes) come together to produce one fertilized cell (Zygote).



#### • Advantages:

- Offspring are genetically different from the parent generation.
- Helps the species survive in an unstable environment.
- Slower rate of reproduction, but faster rate of evolution.
- Improvements in the species occur from generation to generation through natural selection.

#### • Disadvantages:

- Energy is expended to find, court, and copulate with a mate.
- Only half the individuals within a species are capable of producing offspring.
- Good genes can be covered up in the process.



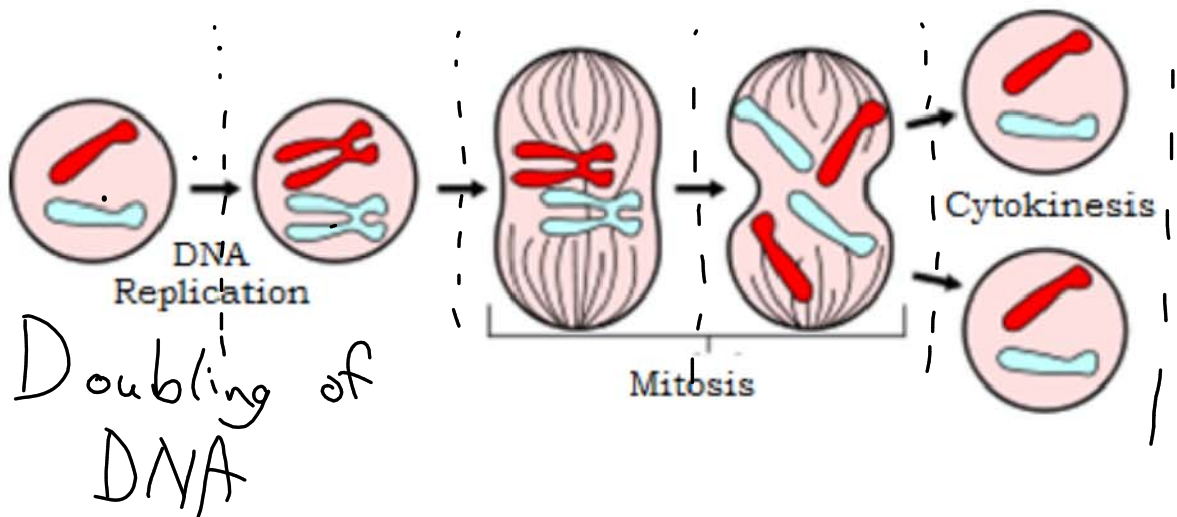
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Processes that Make it All Happen: MITOSIS & MEIOSIS

- Asexual reproduction <sup>without</sup> ~~would not be possible~~ mitosis.
- Mitosis is the process that duplicates & then divides the cell's nucleus
- Allows cells to be copied and reproduced without losing genes.
- Makes new generations that are identical to the previous generation.
- Ex: skin cell production growth healing
- All 5 forms of asexual reproduction



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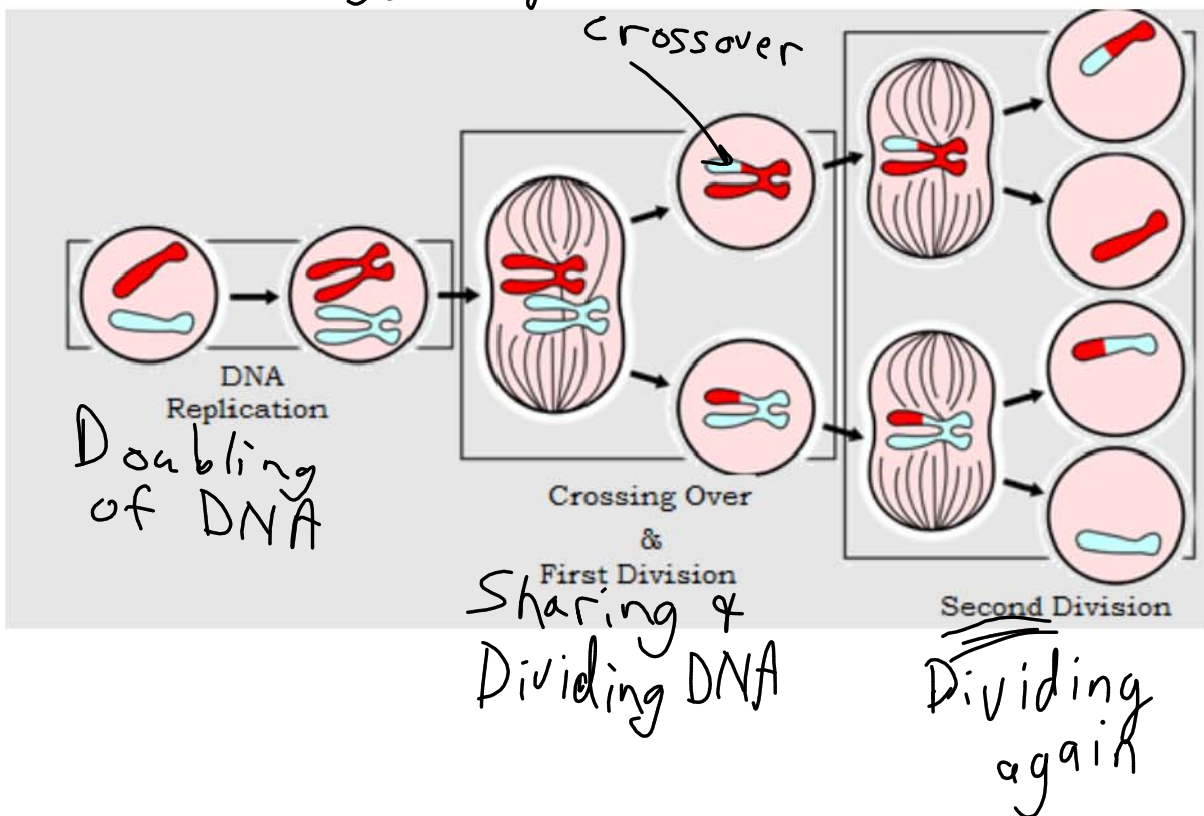
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# • Sexual Reproduction would not be possible without meiosis

○ Meiosis is the process of dividing the nucleus to produce gametes (sex cells)

- Body cells have 2 copies of every gene, but after meiosis, sex cells (egg & sperm) only have 1 copy of every gene.
- Allows for diversity amongst offspring since the sex cells are not all identical to each other.
- Occurs only in sex cells (gametes)
  - Ex: egg and sperm



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**Reaction 7.01** – Compare and Contrast the *processes* and *results* of Mitosis & Meiosis.

