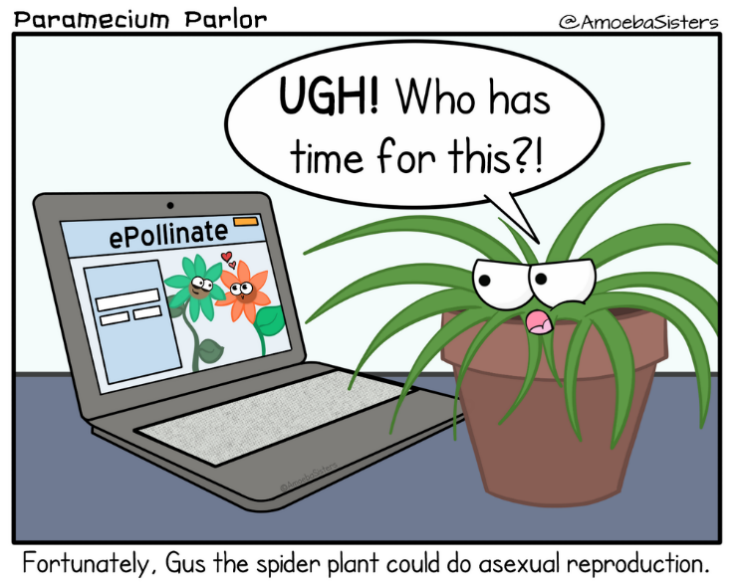
**Reproduction**

## Asexual Reproduction vs Sexual Reproduction

|  |  |
| --- | --- |
| Requires **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | Requires **two parents** |
| Produces offspring**\_\_\_\_\_\_\_\_\_\_\_\_\_**to the parent. | Produces offspring **\_\_\_\_\_\_\_\_\_\_\_\_\_** from the parents. |
| Can produce**\_\_\_\_\_\_\_\_\_** offspring very **\_\_\_\_\_\_** | Requires **\_\_\_\_\_\_\_\_\_** time and **\_\_\_\_\_\_\_\_\_\_\_\_**to produce offspring |
| Results in **limited \_\_\_\_\_\_\_\_\_­\_\_\_**within a species | Results in **lots of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** within a species |
| **Mitosis** is one form of asexual reproduction and results in **offspring** that are **\_\_\_\_\_\_\_\_\_\_\_\_\_** to parent | **Meiosis** is used to produce specialized **sex cells** called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: **\_\_\_\_\_\_\_\_\_\_\_**(from males) and **\_\_\_\_\_\_\_\_\_\_\_** (from females), which combine to produce a new individual. |



**How SEXUAL REPRODUCTION Works: Requires Two Parents 🡪  
 DNA from each parent combines 🡪 Genetically unique offspring**

Diagram

Description automatically generated

**In Humans the** **Process of Fertilization:**

* 1. A single sperm **penetrates** the outer covering of the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (egg)
  2. **Nuclei** of sperm and ovum **fuse** = single **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**cell is forme.
  3. The fertilized cell is called an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
  4. The **zygote** begins to divide by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** producing more cells.
  5. Once a zygote becomes two cells, it is called an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**. The embryo increases in size by further cell division (mitosis) and eventually develops specialized cells which make up various body structures in an organism.

**What’s Essential to Sexual Reproduction?**

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at the same\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so that genetic information can be combined.

**Internal Fertilization External Fertilization**

|  |  |
| --- | --- |
| -Sperm meet egg \_\_\_\_\_\_\_\_\_\_\_\_ female body  -Embryo/offspring develop \_\_\_\_\_\_\_\_\_\_\_\_\_ by parents  -Few offspring | -Sperm meet egg \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  -Lots offspring produced quickly  -\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to outside world  -Many offspring don’t survive |

**Eg. Eg.**

**Success after fertilization requires:**

* + enough \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and appropriate temperature
  + protection from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Pollen /Seed Transport  
  
Purpose:** Increase \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Diversity and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of Offspring

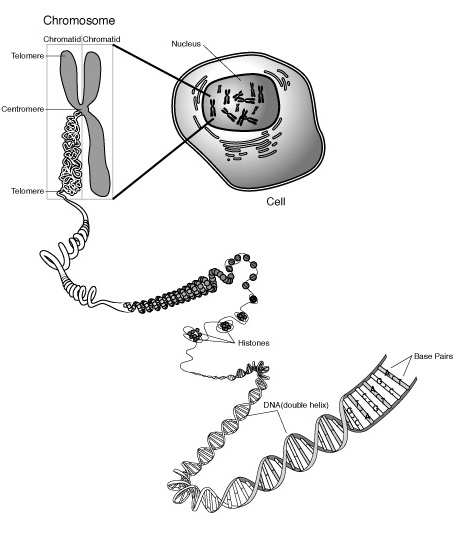
* Move *pollen* or *seeds ­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_* from parent (as far as possible)
* Genes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rather than remaining near parent
* *Pollen* (containing*\_\_\_\_\_\_\_\_\_\_\_\_\_*) released and carried by wind to female parts by insects and some birds by\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Some Common Pollinators are:

**Seed Dispersal:***How?   
 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Purpose of Fruit**

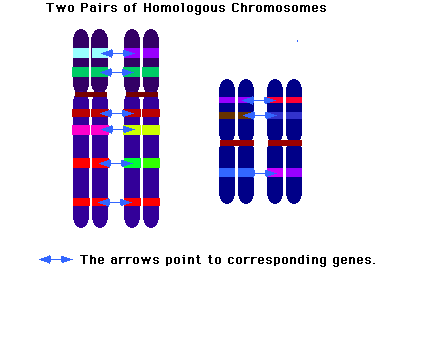
* Fruit contain seeds which hold the zygote (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
* Eaten by animals and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to form new plants.
* New plants grow \_\_\_\_\_\_\_\_\_\_\_\_\_ from parent plants so \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_competition for food and other resources which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_survival of offspring.
* Fruit also \_\_\_\_\_\_\_\_\_\_\_\_\_ seeds from environment. ***Complete Assignment on Sexual vs Asexual Reproduction***

**Diploid vs Haploid Cells and Meiosis**

**Chromosomes are compacted DNA!**

* Chromosomes contain **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**information
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ensures all cells in the body (except sex cells) have the same DNA and **the same number** and **kind** of chromosomes
* Mitosis occurs in **somatic** or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** cells

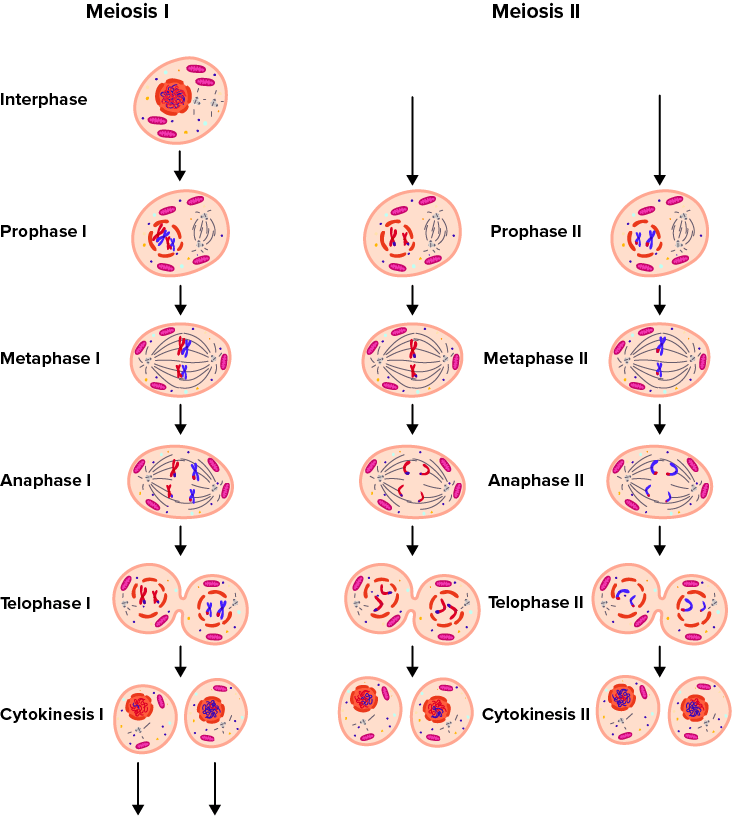
Ex:

**Diploid Cells**

* Every organism has its own unique **number** of chromosomes. Humans have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

This is called its **diploid** number or the total number of chromosomes in a body cell.

Diploid means “**2 \_\_\_\_\_\_\_­­­­\_\_­\_\_\_**” and is written as “**2n**”.

* Body cells of **adult** organisms have 2 sets of   
  (matching) chromosomes –   
  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ chromosomes**1 set from **female** parent gamete and  
  1 set from **male** parent gamete

Haploid Cells

* Gametes are specialized \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ produced  
   during \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. A similar process to mitosis   
  which involves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Gametes are **haploid cells** (n) because each sperm or   
  egg cell only has \_\_\_\_\_\_\_\_\_\_\_\_ of each chromosome.

**Meiosis – Formation of Gametes**

**Two Parts:** **Meiosis I**- PMAT I and **Meiosis II-**PMAT II

Prophase I, Metaphase I, Anaphase I, Telophase I Interkinesis

Prophase II, Metaphase II, Anaphase II, Telophase II and Cytokinesis

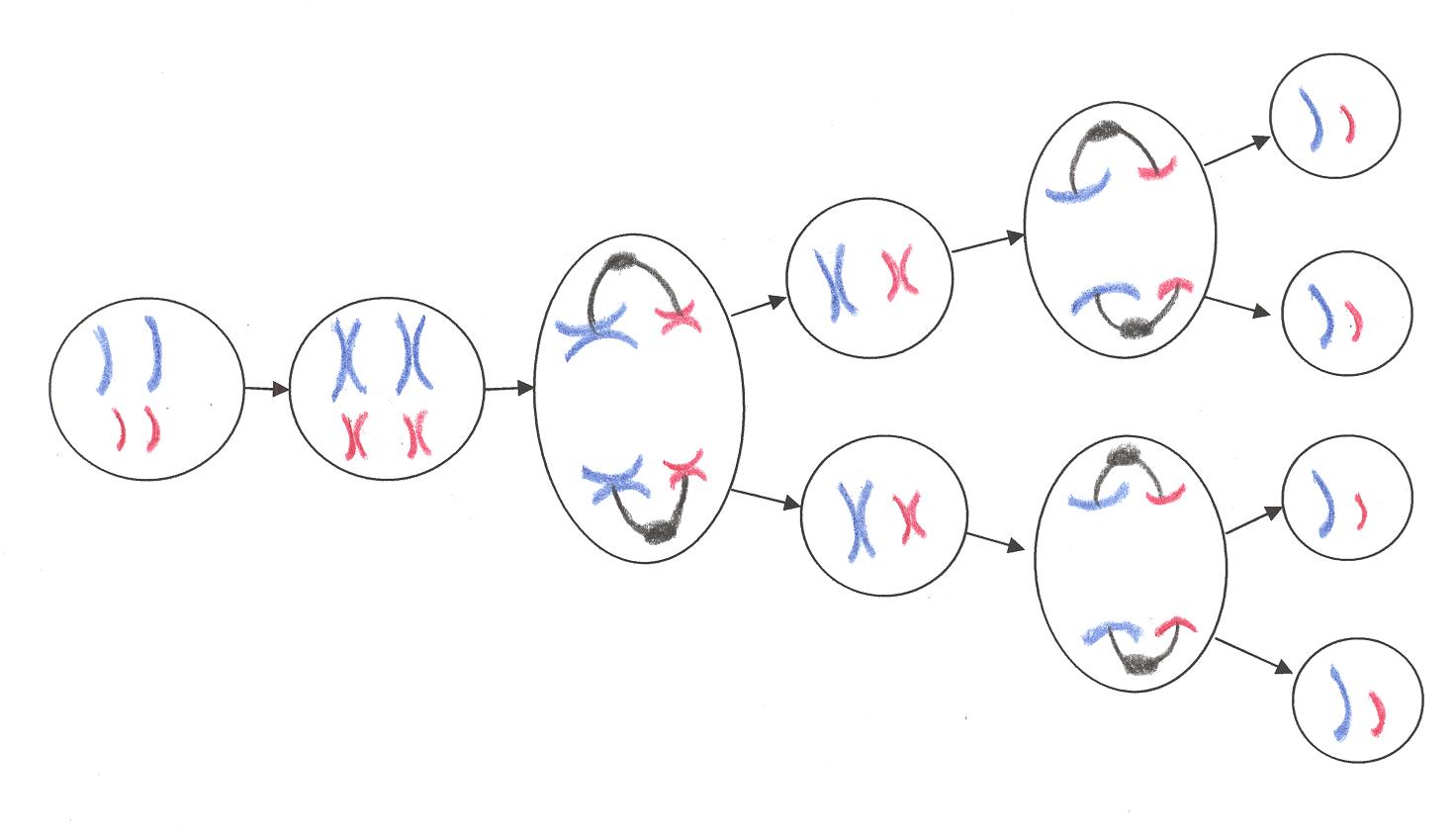
**Meiosis –**  the process in which the number of chromosomes in the original cell is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** by**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** through the separation of **homologous** chromosomes

* Meiosis occurs in **sex** organs only

1. Males (**XY**) – sex organs are the**\_\_\_\_\_\_\_\_\_\_\_\_\_** in humans
2. Females (**XX**) – sex organs are the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in humans
3. Meiosis also occurs in the sex organs of other animals, plants, fungi, etc…

* When does meiosis occur in humans?

1. Males beginning at**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. Females before **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – all eggs are produced **before** birth and at puberty eggs **mature**



Parent cell

Chromosomes duplicate

**Division 1**

**Division 2**

Daughter cells (gametes) have **\_\_\_\_\_\_\_** as many chromosomes as parent cell

Sex Cells

* Meiosis produces **sex** cells called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_– cells with ½ the number of **chromosomes** as the original parent cell

1. Diagram

   Description automatically generatedMales – meiosis produces\_\_\_\_\_ **sperm**
2. Females – meiosis produces  
    **1** (viable) **egg**

-The other 3 cells are called **polar bodies** – they give up their **cytoplasm** to nourish the 1 healthy egg.

**Unique events in Meiosis**

* **Homologous (matching) chromosomes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** before 1st cell division

Homologous chromosomes:

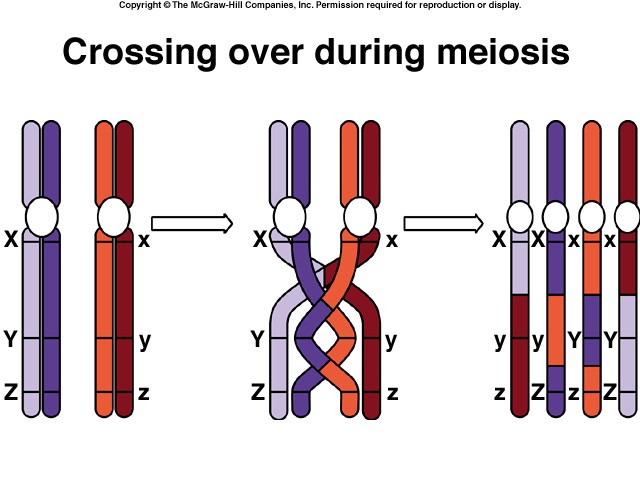
-look alike

-code for same traits

-receive one from each parent

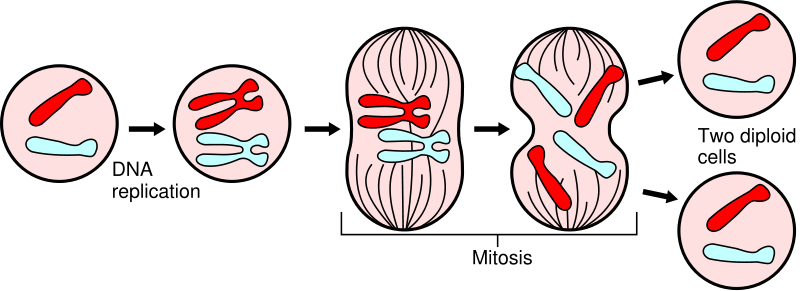
* **Diagram

  Description automatically generated**During 1st division, homologous chromosomes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_genes** during process called “**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**”

****

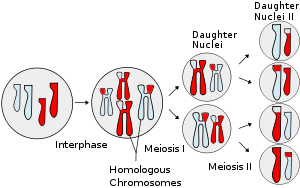
* These **homologous chromosomes** separate during\_\_\_\_\_\_ division of meiosis – so chromosomes in gametes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_from each other due to crossing over

* **Crossing over** increases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variation and is the reason why siblings look \_\_\_\_\_\_\_\_\_\_\_\_\_\_

****

No crossing over – daughter cells are **identical** to parent cells

**Mitosis**

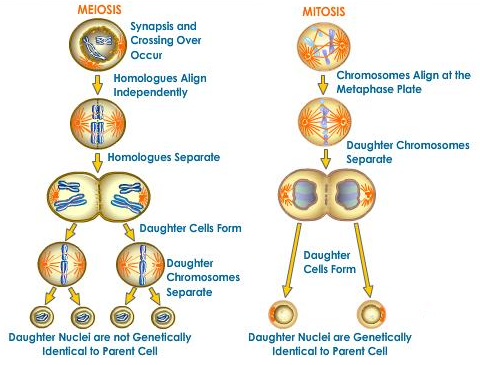
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**Meiosis**

Crossing over occurs –causes **genetic variation**

(Daughter cells are NOT identical to parent cell)

**VIDEO AND SNURFLE MEIOSIS ACTIVITY**

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**Comparing Mitosis and Meiosis**

|  |  |  |
| --- | --- | --- |
|  | **Meiosis** | **Mitosis** |
| **Where does this process occur?** | Male (**XY**) = in\_\_\_\_\_\_\_\_\_\_\_\_\_  Female (**XX**) = in\_\_\_\_\_\_\_\_\_\_\_\_ | in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **What kind of cells are produced?** |  |  |
| **When does this occur?** | Male (**XY**) = **puberty**  Female (**XX**) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Any time** |
| **# of Divisions**  **(Draw picture)** | **\_\_\_\_** | **\_\_\_\_** |
| **# of Daughter cells produced** | Male (**XY**) = **\_\_\_\_\_ sperm**  Female (**XX**) = **\_\_\_\_ viable egg(s)** | **\_\_\_\_\_** |
| **# of Chromosomes in daughter cells** | \_\_\_\_\_\_\_\_ as many as parent cell  **ha**ploid or **N**  In humans \_\_\_chromosomes/gamete | **Same** as parent cell  **di**ploid or **2N**  In humans \_\_\_\_\_chromosomes/cell |
| **Type of Reproduction** |  |  |
| **Genetic Composition** | Daughter cells are  identical / not identical  to parent cell  **Genetic** **variation** | Daughter cells are  identical / not identical  to parent cell |
| **Pairing of Homologous Chromosomes** | YES / NO  **Crossing** **over** of genes occurs during \_\_\_\_\_\_\_\_phase \_\_\_ of meiosis | YES / NO |
| **Function/Importance** | To produce haploid cells called:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Growth, repair; development of adult from zygote** |

**Exit Reflection Questions:**

What is an advantage of sexual reproduction and a disadvantage? Use a specific example to explain.

What is the difference between an ovum, embryo and a zygote?

Why do humans have two copies of each chromosome in each body cell instead of only one?

What process is responsible for combining the two sets of chromosomes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What two processes only occur during meiosis and not during mitosis?

A dog has a diploid chromosome number of 78 in each body cell. How many chromosomes would be in each gamete cell?