

# Lecture Guide: Mendel's Experiments

DOWNLOAD THE LECTURE NOTES AT: <http://www.biologyknight.blogspot.com> **THE FATHER OF GENETICS:**

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

Period: \_\_\_\_\_

## Instructions:

- 1) On one side of each page, provide the missing terms from the lecture to complete your notes.
- 2) On the opposite side of each page, write your own questions and comments based upon your understanding of the lecture.
- 3) Use the entire page when prompted to make drawings, complete tables, graphs etc. in the indicated boxes.
- 4) Use the completed lecture guide to prepare your own notebook, which should represent your best work!

Mendel developed 'Laws' of inheritance using ideas from math! The \_\_\_\_\_ Rule says that the chance of two mutually-\_\_\_\_\_ events is the \_\_\_\_\_ of their individual probabilities, while the \_\_\_\_\_ Rule says that the probability of two \_\_\_\_\_ events is the \_\_\_\_\_ of their individual probabilities.

Suppose that there is a 40 percent probability of carrying a gene for dimples and a 20 percent probability of having a gene for freckles. What is the probability of being both dimpled and freckled?

PERCENT

\_\_\_\_\_ *MENDEL*  
( \_\_\_\_\_ - \_\_\_\_\_ )

- ☐ born into a poor \_\_\_\_\_ family (ethnic \_\_\_\_\_)
- ☐ as youth, placed in a \_\_\_\_\_ monastery
- ☐ studied math and science at a \_\_\_\_\_ university
- ☐ ordained a \_\_\_\_\_ at age 25
- ☐ between 1853-1857 taught high school \_\_\_\_\_, and in his spare time experimented with \_\_\_\_\_ plants

## MENDEL'S EXPERIMENTS:

- ☐ established \_\_\_\_\_ as a science
- ☐ combined careful \_\_\_\_\_ with \_\_\_\_\_ analysis (unusual at the time)
- ☐ are described in his \_\_\_\_\_ paper "Experiments in Plant \_\_\_\_\_"
- ☐ were \_\_\_\_\_, along with his ideas, during his lifetime

## MENDEL'S EXPERIMENTS:

Mendel crossed \_\_\_\_-breeding lines of pea plants with contrasting characters (\_\_\_\_\_) for the same trait . . .

Mendel controlled the \_\_\_\_\_ of the pea plant's flowers to make his \_\_\_\_-breeding lines . . .

Flowering plants have male and female parts: they can fertilize themselves (\_\_\_\_ - \_\_\_\_\_) or be fertilized by other flowers (\_\_\_\_ - \_\_\_\_\_)

When Mendel crossed the \_\_\_\_ - breeding lines to produce the first generation (the \_\_\_\_), all the offspring had only one \_\_\_\_\_.

Since all the \_\_\_\_\_ only showed one trait, Mendel called that trait the \_\_\_\_\_, while the one that had vanished he called the \_\_\_\_\_.

However, then Mendel allowed the \_\_\_\_ plants to reproduce by \_\_\_\_ - pollination, the recessive trait reappeared (!) in about one-fourth of the \_\_\_\_ plants!

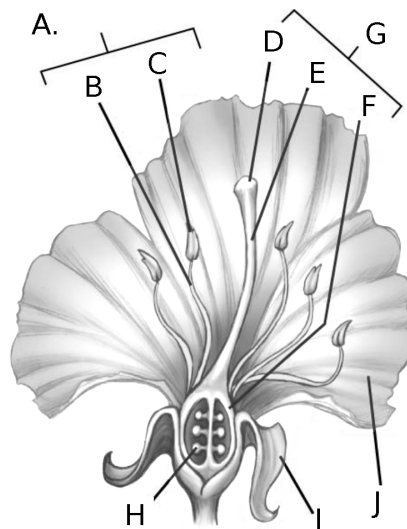
Mendel concluded that the factors (*Merkmal*) did *NOT* \_\_\_\_\_.! Instead, these factors remained \_\_\_\_\_ and distinct.

This has been called Mendel's 1<sup>st</sup> "Law": the \_\_\_\_\_ of \_\_\_\_\_. But what is it that segregates?

The answer: \_\_\_\_\_!

An \_\_\_\_\_ is one of two or more \_\_\_\_\_ forms of a gene.

So let's *REVIEW*....



**Identify the labeled flower parts above:**

**A:** \_\_\_\_\_

**B:** \_\_\_\_\_

**C:** \_\_\_\_\_

**D:** \_\_\_\_\_

**E:** \_\_\_\_\_

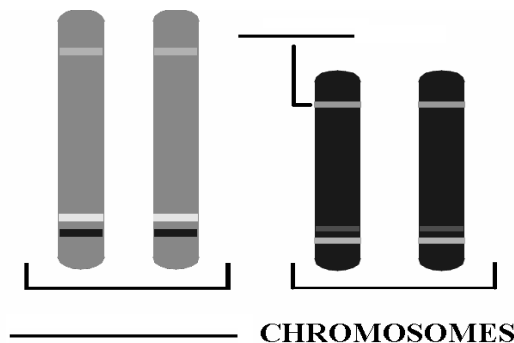
**F:** \_\_\_\_\_

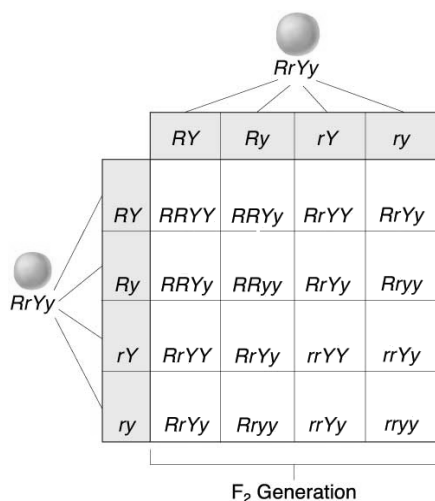
**G:** \_\_\_\_\_

**H:** \_\_\_\_\_

**I:** \_\_\_\_\_

**J:** \_\_\_\_\_





There are ten different *genotypes* listed in the square above, which lead to four different *phenotypes*.

List the ten different **genotypes** below, and use colored pencils to lightly shade the boxes that share the same phenotype.

- 1 \_\_\_\_\_ 6 \_\_\_\_\_
- 2 \_\_\_\_\_ 7 \_\_\_\_\_
- 3 \_\_\_\_\_ 8 \_\_\_\_\_
- 4 \_\_\_\_\_ 9 \_\_\_\_\_
- 5 \_\_\_\_\_ 10 \_\_\_\_\_

- ☐ yellow and smooth
- ☐ green and smooth
- ☐ yellow and wrinkled
- ☐ green and wrinkled

In every \_\_\_\_\_ cross he attempted, Mendel only saw the dominant in the F<sub>1</sub>, but he saw a \_\_\_\_: \_\_\_\_ ratio of dominant to recessive in the F<sub>2</sub>, demonstrating the \_\_\_\_\_ of \_\_\_\_\_. We now know that what \_\_\_\_\_ are two or more alternate forms of a gene, or \_\_\_\_\_.

Mendel wondered: what would happen if he attempted a \_\_\_\_\_ cross for peas that showed \_\_\_\_\_ different traits? Would the sorting of the one affect the other?

### THE \_\_\_\_\_ CROSS:

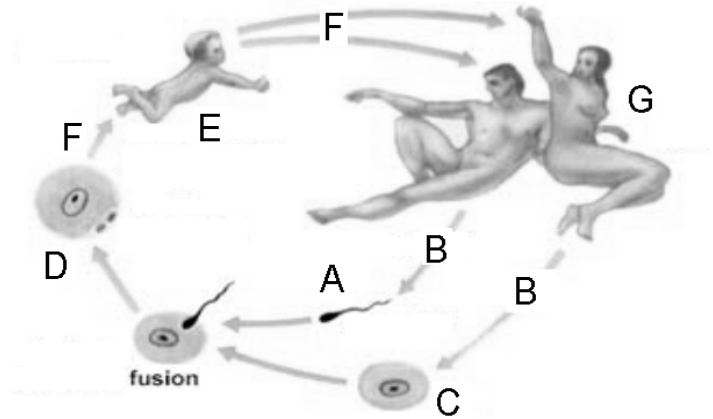
- ☐ produced peas which were \_\_\_\_\_ for two different traits
- ☐ 9 \_\_\_\_\_ and \_\_\_\_\_!
- ☐ 3 \_\_\_\_\_ and \_\_\_\_\_!
- ☐ 3 \_\_\_\_\_ and \_\_\_\_\_!
- ☐ 1 \_\_\_\_\_ and \_\_\_\_\_!
- ☐ This is a: \_\_\_\_: \_\_\_\_: \_\_\_\_: \_\_\_\_ ratio. You can think of it as the original ratio, squared: (\_\_\_\_\_)

*Mendel's interpretation:* alleles sort randomly, and \_\_\_\_\_ of one another! This is Mendel's 2<sup>nd</sup> "Law": the \_\_\_\_\_ of \_\_\_\_\_

This random, independent \_\_\_\_\_ is one of the reasons why offspring tend to resemble, but are never identical to their parents. \_\_\_\_\_ and the phenomena of '\_\_\_\_\_ -over' during meiosis also help generate new combinations of \_\_\_\_\_. This genetic \_\_\_\_\_ leads to the \_\_\_\_\_ of life!

## POPULATION:

- ☐ A \_\_\_\_\_ group of organisms, capable of \_\_\_\_\_ with each other
- ☐ A \_\_\_\_\_ consists of \_\_\_\_\_ the populations in the world capable of \_\_\_\_\_ with each other



## VARIATION:

- ☐ Differences within \_\_\_\_\_ between populations, based on differences in \_\_\_\_\_
- ☐ is produced, in part, by \_\_\_\_\_ reproduction, which involves \_\_\_\_\_.

**Identify the labeled structures or events in the human life cycle shown above in the spaces below:**

*There are many \_\_\_\_\_ of human beings in different parts of the world. Individuals show \_\_\_\_\_ from one another, and so do the \_\_\_\_\_. Despite that, we are all members of the same \_\_\_\_\_!*

**A:** \_\_\_\_\_

**B:** \_\_\_\_\_

**C:** \_\_\_\_\_

**D:** \_\_\_\_\_

**E:** \_\_\_\_\_

**F:** \_\_\_\_\_

**G:** \_\_\_\_\_

## MEIOSIS:

- ☐ is a special form of cell division used to produce \_\_\_\_\_ (eggs and sperm).
- ☐ Most cells in the human body are \_\_\_\_\_ (\_\_\_\_), having two copies of each chromosome (for a total of 46).
- ☐ \_\_\_\_\_, however, are \_\_\_\_\_ (1n)
- ☐ randomly assigns different \_\_\_\_\_ to different cells, so that each new \_\_\_\_\_ is genetically unique, leading to more \_\_\_\_\_ in the future population!

**What event in meiosis helps 'shuffle the deck' even further?**

\_\_\_\_\_