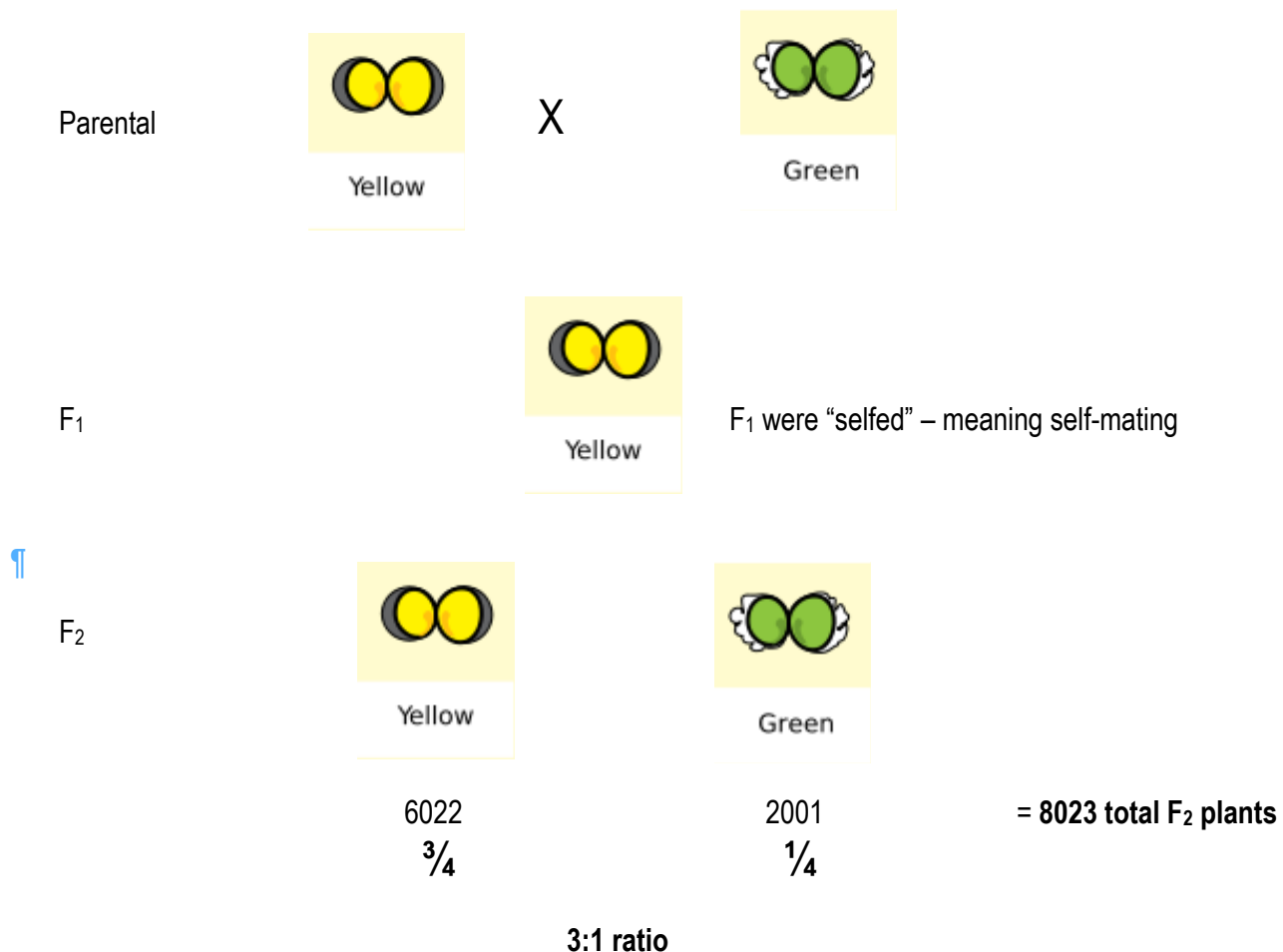<u>**CONCEPT:**</u> <u>MENDELS EXPERIMENTS AND LAWS</u>

<u>Mendel's Experiments</u>

● Gregor Mendel was an Austrian monk who studied Genetics using pea plants

    □ Mendel used **pure lines** meaning that all offspring produced by pure line mating will be identical for that trait

        - Ex: Yellow-seeded pure line mating will produce yellow-seeded offspring

    □ Mendel labeled each generation in a specific way

        - **Parental (P) Generation**: Is the first mating that occurs

        - **First Filial (F_1) Generation:** is the offspring produced from parental mating

            - These often undergo **self-mating** where one plant's pollen is used to fertilize itself

            - Can also undergo **cross-fertilization** where one plant's pollen is used to fertilize another plant

        - **Second Filial (F_2) Generation:** is the offspring produces from F_1 mating
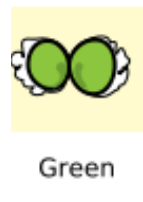
EXAMPLE: One of Mendel's Crosses

Parental   Yellow   X   Green

F_1 Yellow F_1 were "selfed" – meaning self-mating

¶

F_2 Yellow   Green

             6022   2001   **= 8023 total F_2 plants**

             ¾   ¼

3:1 ratio

Each F$_2$ plant was "selfed"

1. F$_3$ from yellow F$_2$

Yellow

Green

¾

¼

2. F$_3$ from green F$_2$
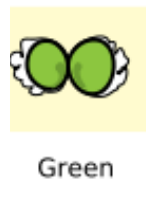
Green

100%

Then, he did an different cross. He mated a F$_1$ yellow with a green

Yellow   X   Green

½   ½

At the end of these crosses he knew

1. Yellow seeded plants always produced at least some yellow seeded offspring
2. Selfed, green seeded plants only produced other green seeded offspring
3. The green seeded plant trait could skin generations

Mendel's Laws

● By studying pea plants, Mendel came up with certain properties and laws that govern inheritance

    □ The properties include:

        - There is a heredity factor (gene) that is necessary for producing a certain trait

        - This gene comes in two forms (alleles)

        - One form (allele) is dominant to the other

    □ Mendel's Laws include:

        1. **Law of segregation**: Alleles separate (during meiosis) to form gametes.

          - Each gamete contains a single allele for each trait

        2. **Law of Dominance:** Some alleles are dominant, and others are recessive

        3. **Law of independent Assortment:** Genes for different traits segregate into gametes independently

          - Genes are randomly, and independently, put into gametes

EXAMPLE: A cross of white (W) and red (R) flowers