Unit X. Making Connections in Biology

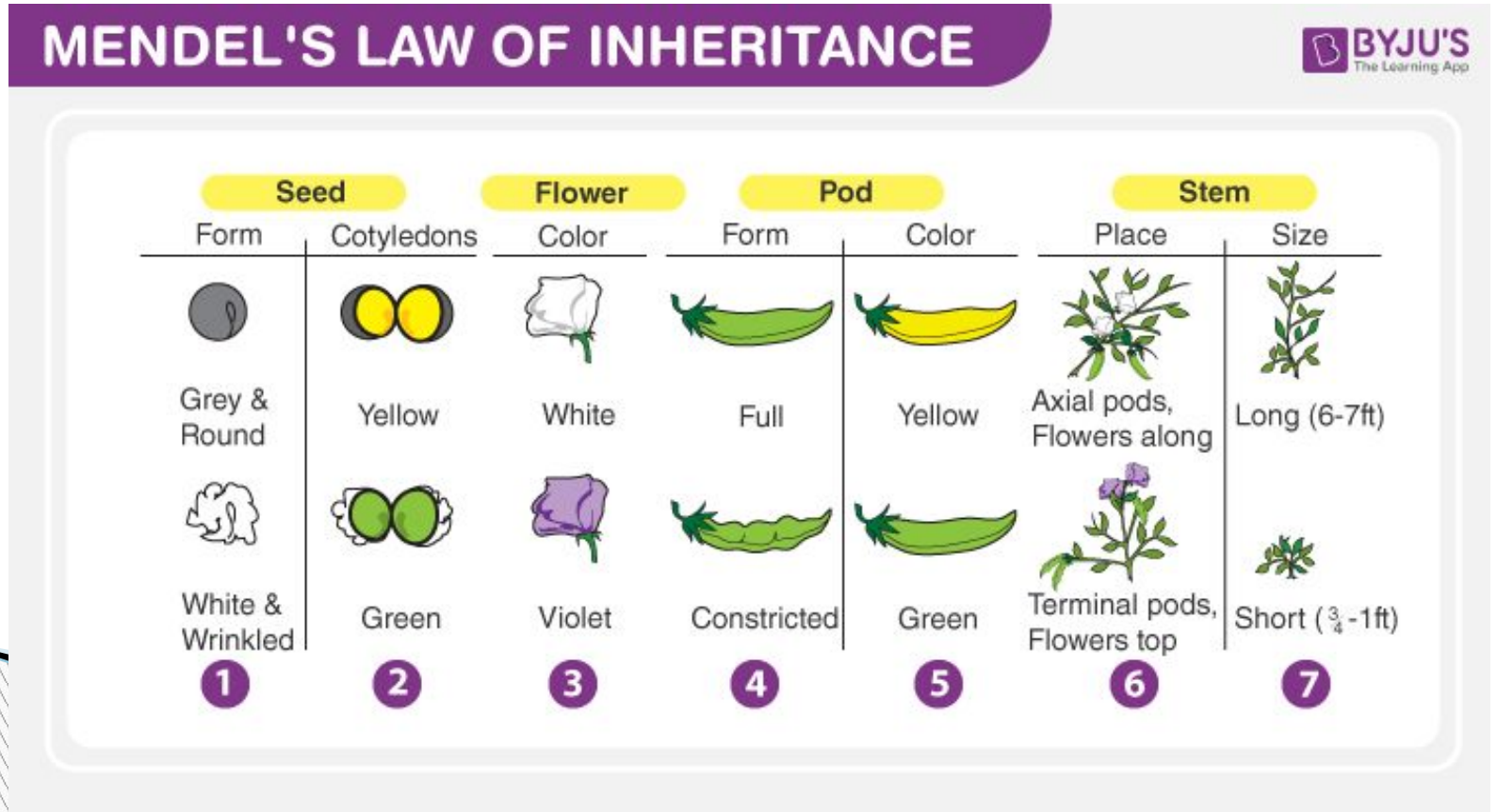
Modern Genetics

1. What important discoveries in Biology do you know?
2. Have you ever wondered why one person in your family has freckles or another has curly hair?

Tell in class

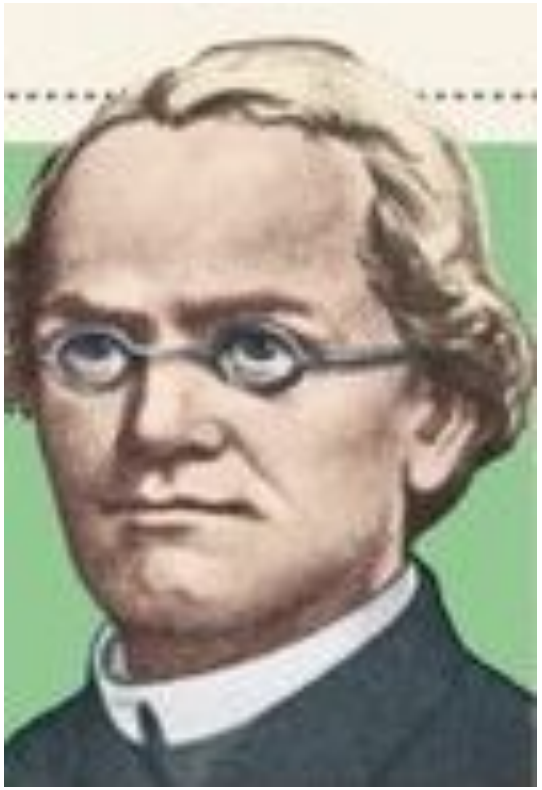
See the video about Mendel's experiment

- https://www.youtube.com/watch?v=Mehz7tCxjSE&vl=en



A Short bio

Gregor Mendel, was born in 1822 and grew up on his parents' farm in Austria. He did well in school and became a monk. He also went to the University of Vienna, where he studied science and math. His professors encouraged him to learn science through experimentation and to use math to make sense of his results. Mendel is best known for his experiments with pea plants like the one pictured above.



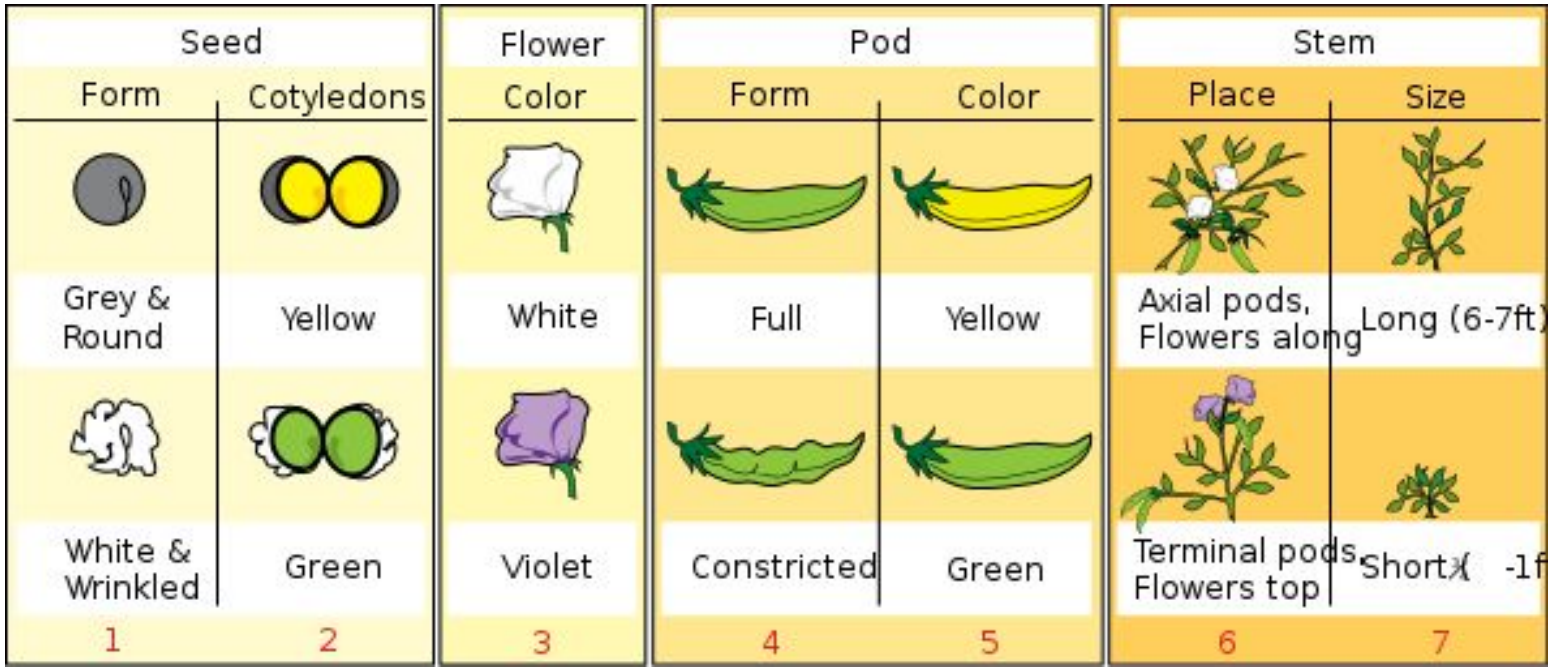
Blending Theory of Inheritance

During Mendel's time, the blending theory of inheritance was popular. This is the theory that offspring have a blend, or mix, of the characteristics of their parents. Mendel noticed plants in his own garden that weren't a blend of the parents. For example, a tall plant and a short plant had offspring that were either tall or short but not medium in height. Observations such as these led Mendel to question the blending theory. He wondered if there was a different underlying principle that could explain how characteristics are inherited. He decided to experiment with pea plants to find out. In fact, Mendel experimented with almost 30,000 pea plants over the next several years!

Why Study Pea Plants?

Why did Mendel choose common, garden-variety pea plants for his experiments? Pea plants are a good choice because they are fast growing and easy to raise. They also have several visible **characteristics** that vary. These characteristics, some of which are illustrated in the figure below, include seed form and color, flower color, pod form and color, placement of pods and flowers on stems, and stem length. Each of these characteristics has two common **traits** (values). For example, seed form may be round or wrinkled, and flower color may be white or purple (violet).

See in next picture



Mendel investigated seven different characteristics in pea plants. In this chart, cotyledons refer to the tiny leaves inside seeds. Axial pods are located along the stems. Terminal pods are located at the ends of the stems.

Mendel's Legacy

- You might think that Mendel's discoveries would have made a big impact on science as soon as he made them, but you would be wrong. Why? Because Mendel's work was largely ignored. Mendel was far ahead of his time and working from a remote monastery. He had no reputation among the scientific community and limited previously published work. He also published his research in an obscure scientific journal. As a result, when Charles Darwin published his landmark book on evolution in 1869, although Mendel's work had been published just a few years earlier, Darwin was unaware of it. Consequently, Darwin knew nothing about Mendel's laws and didn't understand heredity. This made Darwin's arguments about evolution less convincing to many people.
- Then, in 1900, three different European scientists — named DeVries, Correns, and Tschermak — independently arrived at Mendel's laws. All three had done experiments similar to Mendel's and come to the same conclusions that he had drawn several decades earlier. Only then was Mendel's work rediscovered and Mendel himself given the credit he was due. Although Mendel knew nothing about genes, which were discovered after his death, he is now considered the father of genetics.

Conclusion

- Mendel experimented with the inheritance of traits in pea plants at a time when the blending theory of inheritance was popular. This is the theory that offspring have a blend of the characteristics of their parents.
- Pea plants were good choices for the research in part because they have several visible characteristics that exist in two different forms. By controlling pollination, Mendel was able to cross pea plants with different forms of traits.
- In Mendel's first set of experiments, he experimented with just one characteristic at a time. The results of this set of experiments led to Mendel's first law of inheritance called the law of segregation. This law states that there are two factors controlling a given characteristic, one of which dominates the other, and these factors separate and go to different gametes when a parent reproduces.
- In Mendel's second set of experiments, he experimented with two characteristics at a time. The results of this set of experiments led to Mendel's second law of inheritance called the law of independent assortment. This law states that the factors controlling different characteristics are inherited independently of each other.

Task1. Answer for the questions

1. What is the blending theory of inheritance? What observations led Mendel to question this theory?
2. Why were pea plants a good choice for Mendel's experiments?
3. Describe Mendel's first set of experiments, including the results.

Task 2. Fill in: *variation, inheritance, allele, model, offspring, breeding.* Then make sentences using the phrases

- 1_____generation.
- 2_____ in plants
- 3 Selective _____
- 4 Dominant _____
- 5 Primary _____ system
- 6 Fundamental principles of _____

At home see the video. Give analysis about author's experiment

- https://www.khanacademy.org/science/in-in-class-10-biology/in-in-heredity-and-evolution/in-in-heredity-mendels-experiment/v/mendels-experiment-monohybrid-cross-heredity-evolution-biology-khan-academy