

Week 1 (9/30)

Title	What's gene and How it works on us
Age group	18~23
Learning Objectives	<ol style="list-style-type: none"> 1. Observe the different between each species, including their appearance, habituation, and their living environment, and realize the difference is cause by gene. 2. Knowing how the recessive gene and dominant gene effect human traits like hair, eyelids, and thumb. 3. Knowing the structure of DNA through constructing the double helix structure model. 4. Conduct a Fruits DNA extraction experiment to experience the science behind the daily life.
Resources	<p>PowerPoint</p> <p>Video</p> <p>Straws, scissors, adhesive tape.</p> <p>Kiwis, pineapples, dish detergent, normal saline, distilled water, 95% alcohol, beakers, test tubes, gauzes, zipper bag.</p>
Lesson Structure	<p>Lesson:</p> <ol style="list-style-type: none"> 1. Gene decided our species Comparing animal with their appearance, living environment, and what that eat. Each species, included us, Human, have their own characteristic, and gene, decided the creatures characteristic, and determine we, become a human. <p>Without the doubt, gene plays the role on creature's appearance. In most common case, we can tell if the two creature's gene similar or not through observing their appearance, more traits of the two creatures share, more similar their gene will. Take gorilla and human, for example, they have highly similar in their appearance, and their gene, up to 98 percent, is identical.</p> <p>But it doesn't mean that we can know the gene similarity just through observing creatures cover. For example, there have a lot of different between the bananas and human, but actually, the gene of bananas</p>

has 60 percent as same as human gene.

2. **Gene decided our characteristics**

Humans appearance decided by gene. Alleles, conclude a dominant/recessive gene, which deeply effect our outlook.

We described the dominant gene as a older brother, and recessive gene as a younger brother to illustrated the idea that dominant gene will priority express when we have dominant and recessive gene at the same time, just like the bigger brother always more powerful than younger brother.

3. **What's gene?**

Gene like the recipe of creature, recording creature appearance, habituation, and characteristic.

Gene is associate with some common words like DNA, inheritance, and chromosome.

Hands-on activity and experiment:

1. **Hand-made double helix DNA model**

Understanding the DNA double helix structure by directly make one. We use 4 different colors of straw to represent the base paring A, T, C, G. The red straw only can pair with yellow one, and the blue one only can pair with the green one, illustrating that base pair A is pair with T, and base pair C only can pair with G.

2. **Fruits DNA extraction**

DNA is a tiny structure hind in the nucleus, it can't be easy to observe. Through this experiment, we can use some common items like salt, Dishwashing, and alcohol to look deep in the secret of life.

Week 2 (10/7)

Title	"Tiny-Killer"-Virus and Bacteria can make us sick
Age group	18~23
Learning Objectives	<ol style="list-style-type: none"> 1. Knowing what's virus and bacteria. 2. Knowing the pathway virus and bacteria infected us. 3. Have some basic knowing about COVID-19 4. Knowing the importance of washing hands and wearing mask.
Resources	PowerPoint Video Bacteria plates
Lesson Structure	<ol style="list-style-type: none"> 1. Introduce the virus Virus infection pathway, size, and habituation. 2. Introduce COVID-19 Introduce the coronavirus appearance, oriented, and the infected symptoms (SARS). Most important, how much damage it bring to the world (Showing the statistic of infection and dead cases). 3. Highlight the health care knowledge According to the Virus infection pathway, It is important to wash hands, wear mask, and keep 1.5 meter distance to other. 4. Introduce the bacteria Bacteria is also the reason that make us sick. Most common example is the milk tea, which is Taiwanese's favorite drinks when buying the breakfast. The milk tea sold by the shop may contain the Escherichia coli, cause people diarrhea. Due to this reason, in Taiwan, we call the milk tea as a 'The most powerful laxative in the world' 5. Bacteria on hands Bacteria can cause people sick, like diarrhea. The most useful way to prevent us from bad bacteria is to washing hands. Through washing, the bacteria on the

hands dramatically drop.

(We make a comparing of two bacteria plate, the one is touched by the non-washed hands, and the other was touched by the washed-hands, the difference of two is significantly.)

6. Introduce the bacteria plate

We metaphor the dots on the bacteria plate as a “village” of bacteria. We also introduced how the Colony formed by illustrated the bacteria growth curve.