

The background features a dark blue gradient with a glowing cyan DNA double helix on the left and a network of interconnected nodes and lines on the right.

「發展具STEM元素的環境教育課程」主題網絡計劃

DNA技術在食品鑑定中的應用

東華三院甲寅年總理中學

水母? DNA?



中三生物課程



第一週

重溫DNA基礎知識
以生活例子引入活動主題

第二週

體驗活動

第三週

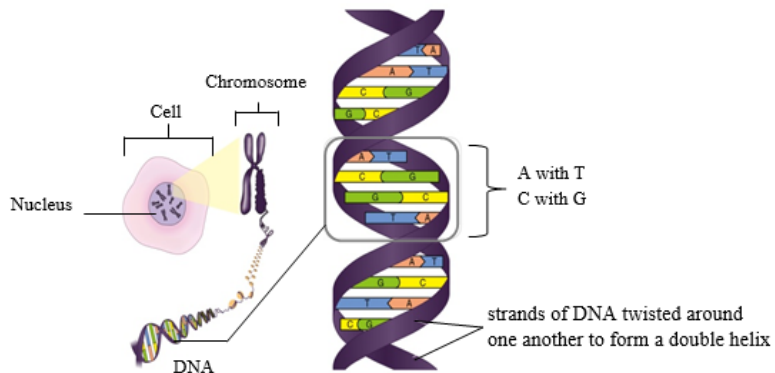
小組匯報 (科技應用)

Food Testing using DNA Technology

DNA

❖ DNA stands for deoxyribonucleic acid (脱氧核糖核酸), which is the genetic material inside the nucleus.

❖ Structure of DNA



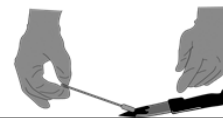
- DNA consists of _____ strands.
- There are four different kinds of bases on the strands: _____, _____, _____ and _____
- **A** always pairs with _____. **C** always pairs with _____.
- The bases pair up in a way called **complementary base pairing** that makes DNA a **double helix**.

❖ The sequences of bases on DNA acts as genetic codes, which encode the instructions for the cells to make different types of proteins in the body. By controlling the types of proteins a cell makes, DNA can determine our characters inherited from our parents.

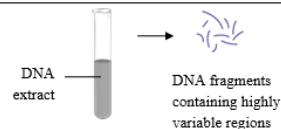
DNA fingerprinting

- ❖ Human DNA contains highly variable regions with repetitive units. The number of repeats and hence the length of these regions vary among individuals (except identical twins).
- ❖ DNA fingerprinting refers to the technique of using highly variable regions of DNA to identify individuals.
- ❖ Steps of DNA fingerprinting:

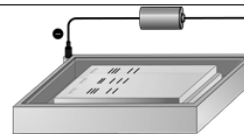
- ❶ Extract DNA from a sample (e.g. hair, blood, saliva or semen).



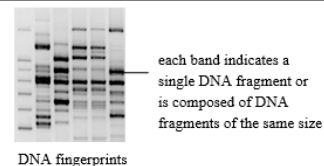
- ❷ Obtain DNA fragments containing the highly variable regions through proper processes.

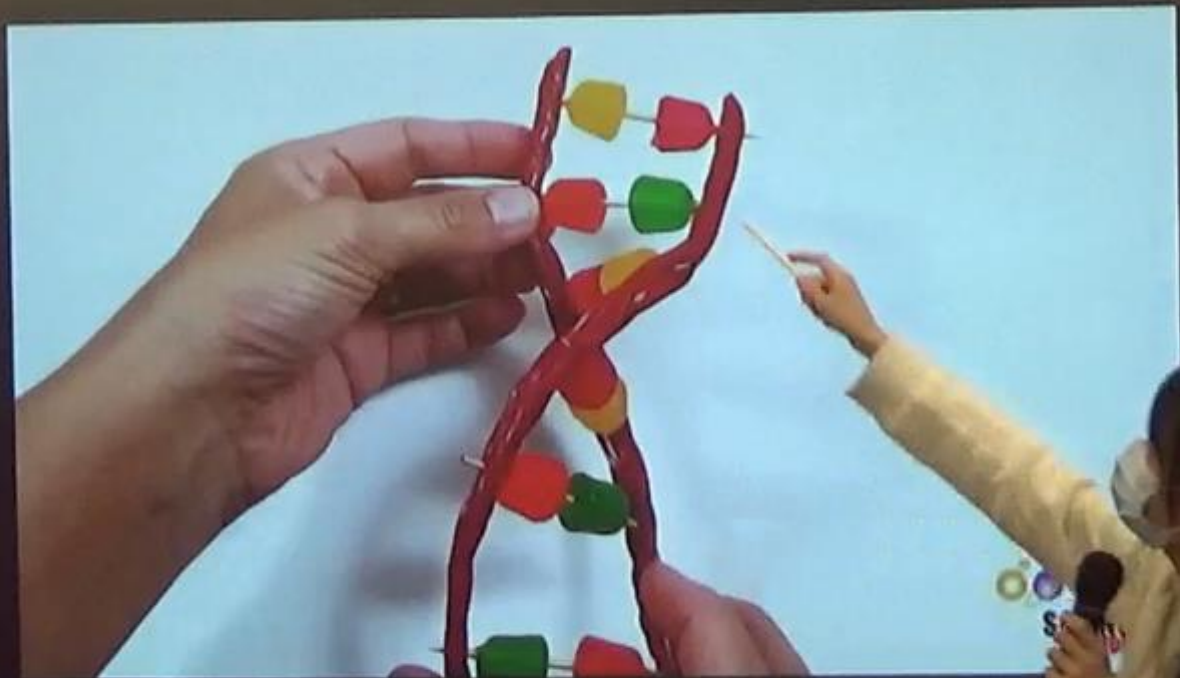


- ❸ Separate the DNA fragments by gel electrophoresis (凝胶电泳) according to their molecular size.



- ❹ The DNA fragments can be revealed by staining. The pattern of DNA bands obtained is called a DNA fingerprint.





\$28/LB

\$26/LB

\$28/LB

\$28/LB

\$20/LB

#11011
#10340
芝心丸
Cheese Ball with Cheese Filling
\$28/LB

#11011
#10340
海鹽味魚丸
Sea Salt Flavored Fish Ball
\$28/LB

#11011
#10340
牛筋丸
Beef Tenderloin Ball
\$28/LB

#11011
#10340
墨魚味丸
Cuttlefish Flavored Ball
\$28/LB

#11011
#10340
丸
\$28/LB

#1052
#103943
豬肉丸
Pork Ball
\$28/LB

#1179
#103413
黑椒牛肉風味丸
Black Pepper Beef Flavored Ball
\$28/LB

#11011
#10340
丸
\$28/LB

#11011
#10340
丸
\$28/LB

#11011
#10340
丸
\$28/LB

偵查報道

港立法禁逾70年

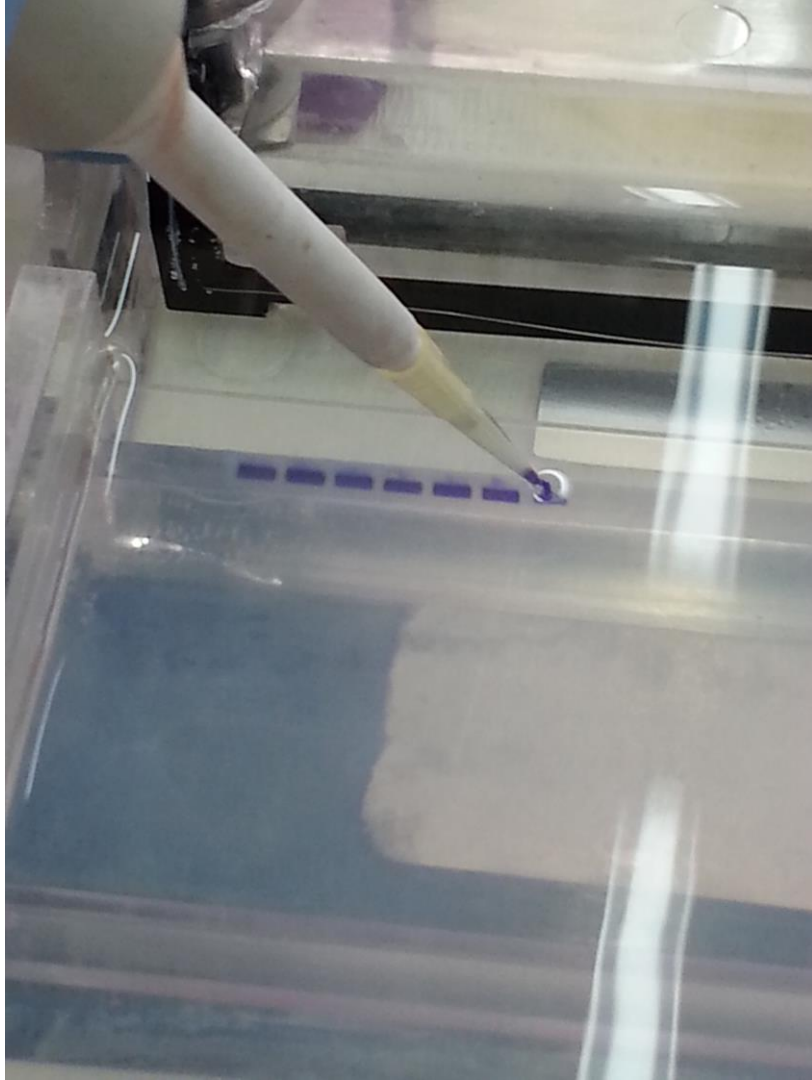
旺角持牌糧食店走私貓狗肉
食環曾接投訴
巡查無發現不了了之

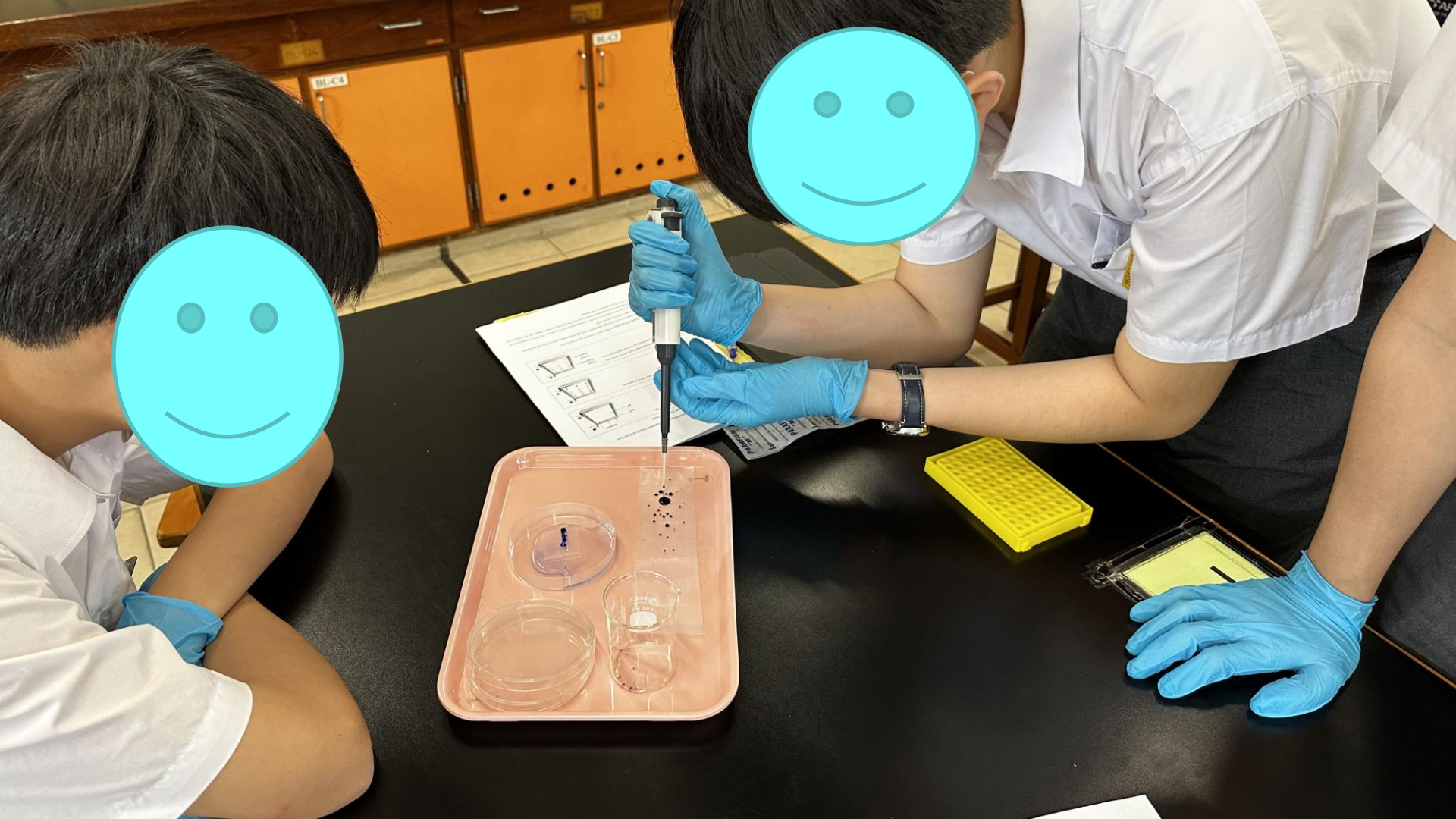
全國研禁食 仍有人反對

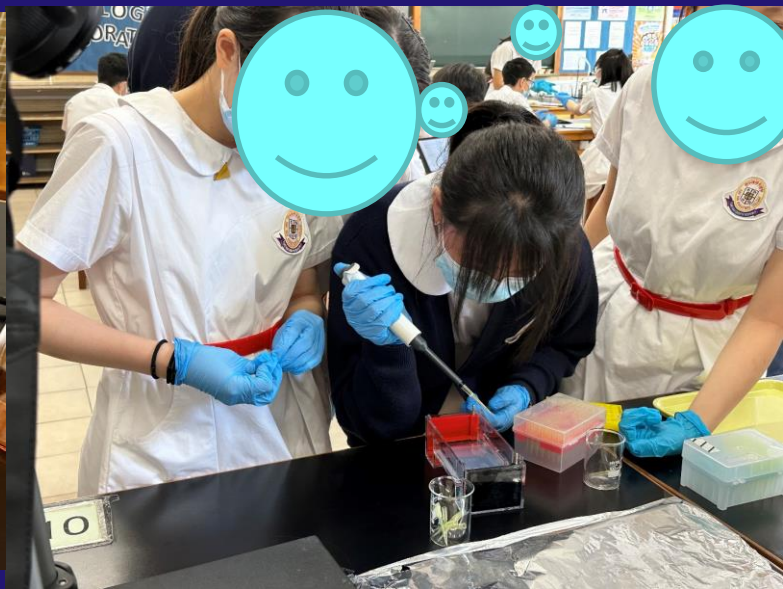
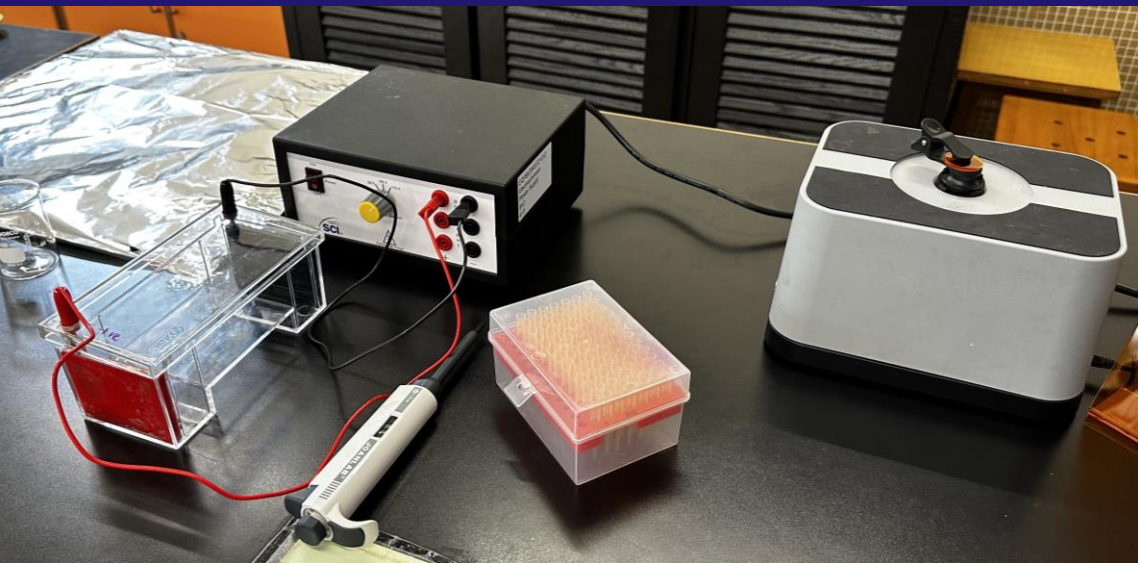


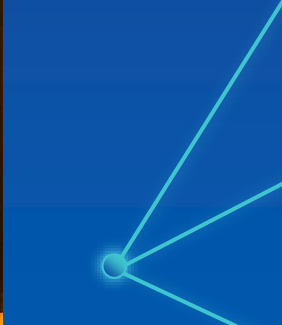
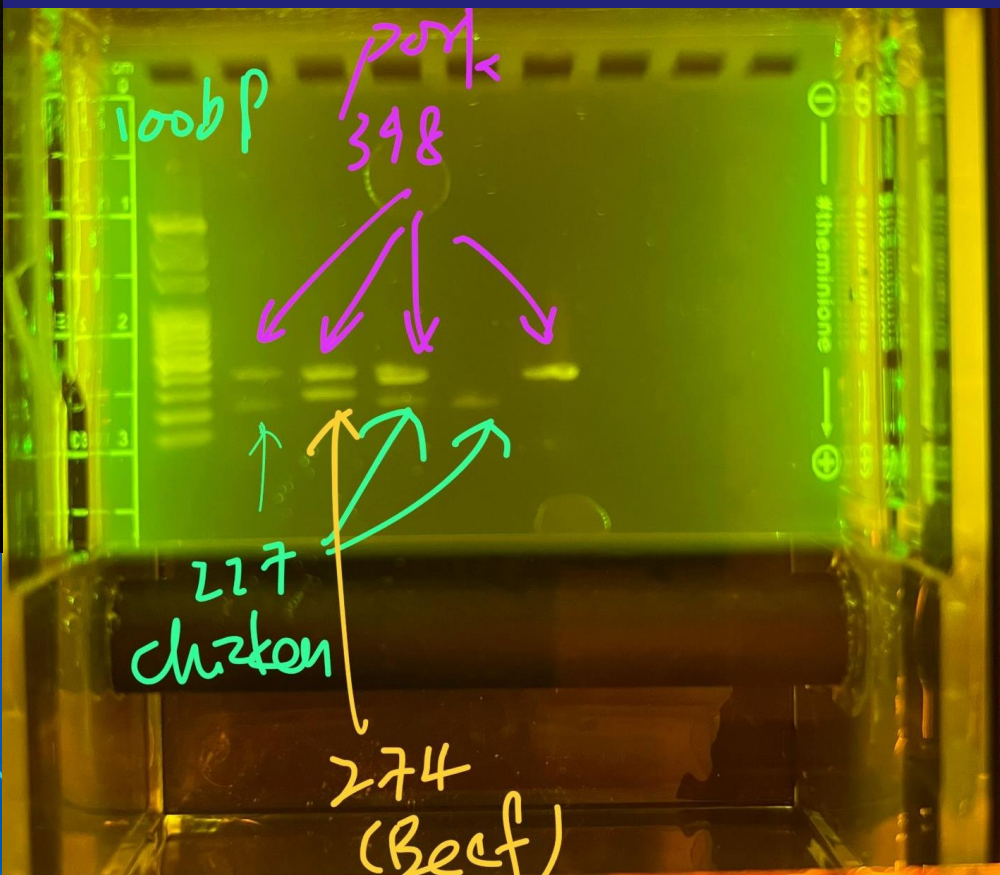
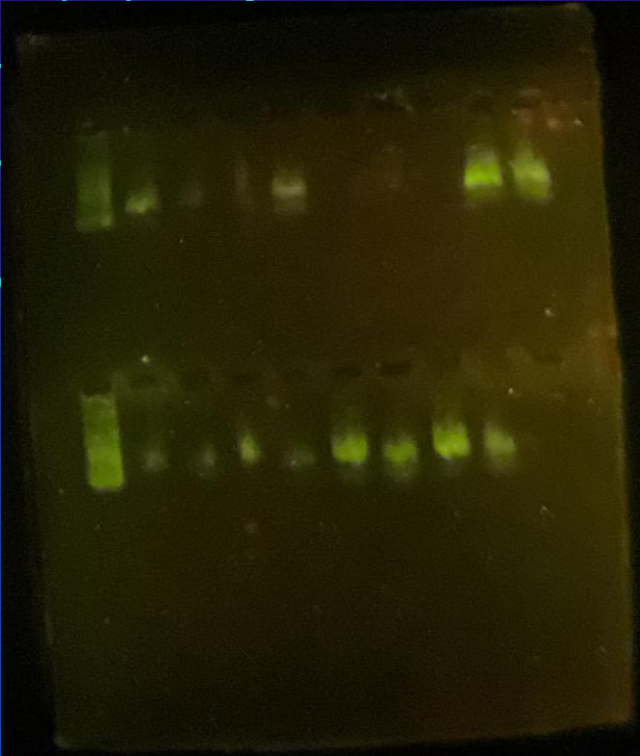


科學探究元素

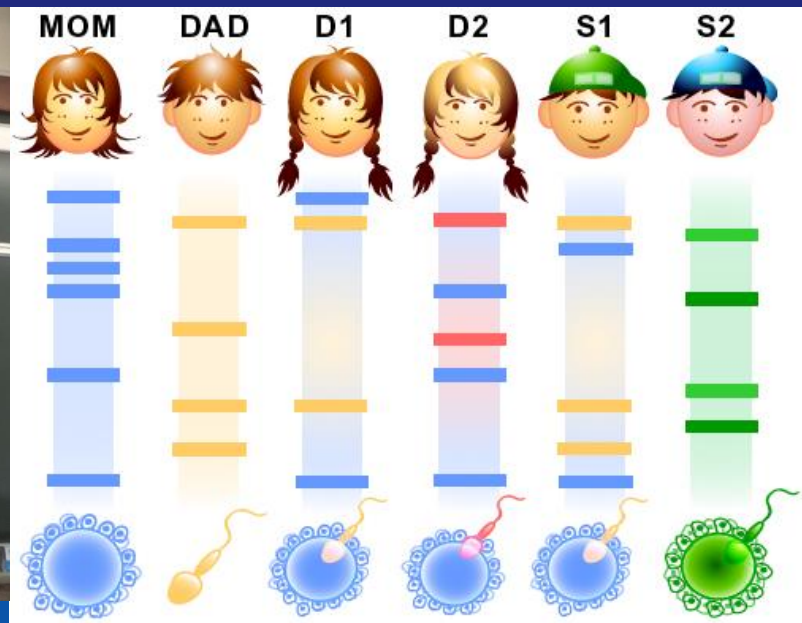
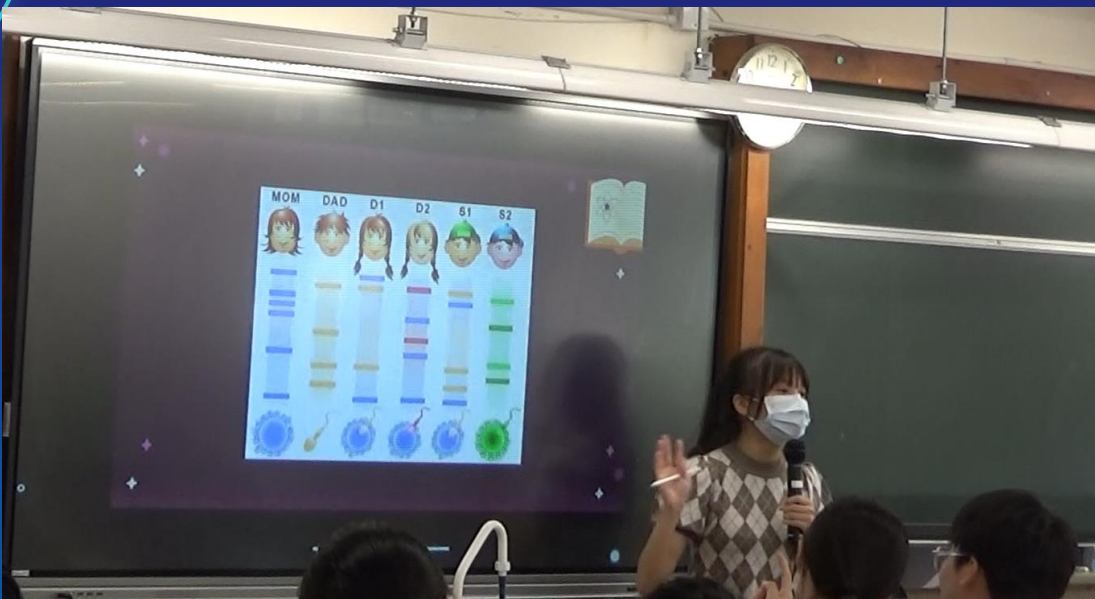








DNA技術應用：親子鑒証





DNA finger-printing technology

The research of traditional Chinese medicine.

-the identification of Chinese medicine.



Why?

-exclude the interference brought by environmental factors to the appraisal of medicinal materials.

-is not affected by the sample form and source of materials.

∴ This is more reliable than some traditional identification methods.

Important:

-improve the quality of Chinese medicine.



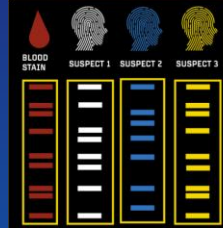
-products enter the international market and the overall research of Chinese medicine will be a big step forward.

-animal and plant of Chinese medicine research and genetic breeding.



IDENTIFY PROSPECTIVE CRIMINAL SUSPECT

FBI AND POLICE LABS AROUND THE U.S. HAVE BEGUN TO USE DNA FINGERPRINTS TO LINK SUSPECTS TO BIOLOGICAL EVIDENCE - BLOOD OR SEMEN STAINS, HAIR, OR ITEMS OF CLOTHING - FOUND AT THE SCENE OF A CRIME. SINCE 1987, HUNDREDS OF CASES HAVE BEEN DECIDED WITH THE ASSISTANCE OF DNA FINGERPRINT EVIDENCE.



PATERNITY TESTS

COMPARISON OF DNA MARKERS CAN SHOW WHETHER A CHILD COULD HAVE INHERITED THEIR MARKERS FROM THE SUSPECTED FATHER



DNA FINGERPRINTING

LEARN THE STORY OF PLANT AND ANIMAL POPULATIONS

TO DETERMINE HOW CLOSELY RELATED SPECIES AND POPULATIONS ARE TO OTHER SPECIES AND POPULATIONS. FURTHER, IT CAN TRACK THEIR SPREAD OVER TIME. THIS ABILITY TO LOOK DIRECTLY AT AN ORGANISM'S GENE MARKERS HAS REVOLUTIONIZED OUR UNDERSTANDING OF ZOOLOGY, BOTANY, AGRICULTURE, AND EVEN HUMAN HISTORY.

PERSONAL IDENTIFICATION

BECAUSE EVERY ORGAN OR TISSUE OF AN INDIVIDUAL CONTAINS THE SAME DNA FINGERPRINT, THE U.S. ARMED SERVICES HAVE JUST BEGUN A PROGRAM TO COLLECT DNA FINGERPRINTS FROM ALL PERSONNEL FOR USE LATER, IN CASE THEY ARE NEEDED TO IDENTIFY CASUALTIES OR PERSONS MISSING IN ACTION. THE DNA METHOD WILL BE FAR SUPERIOR TO THE DOGTAGS, DENTAL RECORDS, AND BLOOD TYPING STRATEGIES CURRENTLY IN USE.

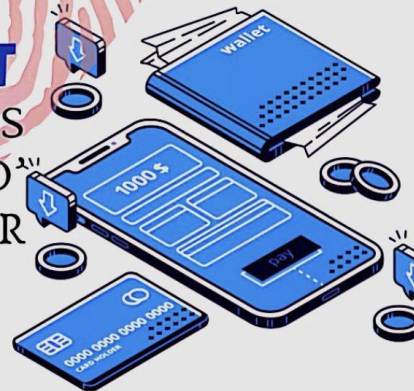


BORDER CONTROL IDENTIFICATION

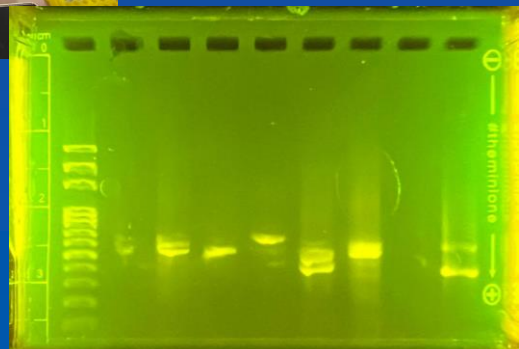
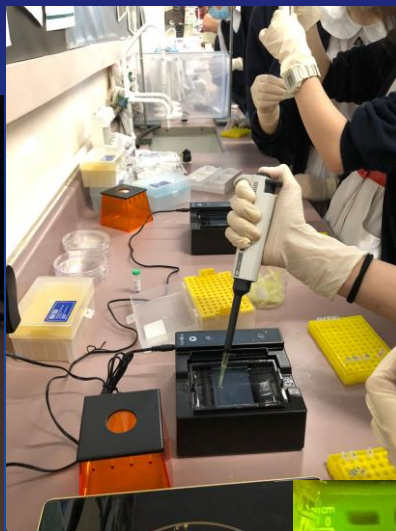
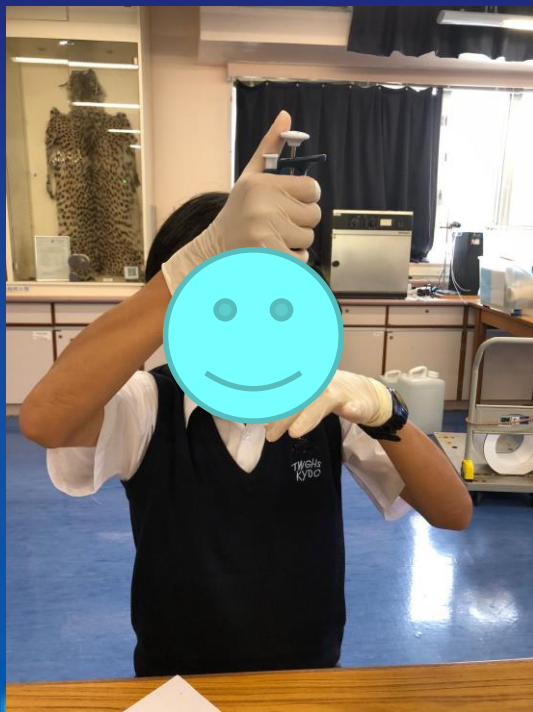
「BIOMETRIC PASSPORTS」
+INCREASED SECURITY
-STREAMLINE THE PROCESS



PAYMENT
X CASH/CREDIT CARDS
+UNIQUE 'PASSWORD'
-HACKER



中五體驗活動



困難

01

相關技術 (PCR, primer)

02

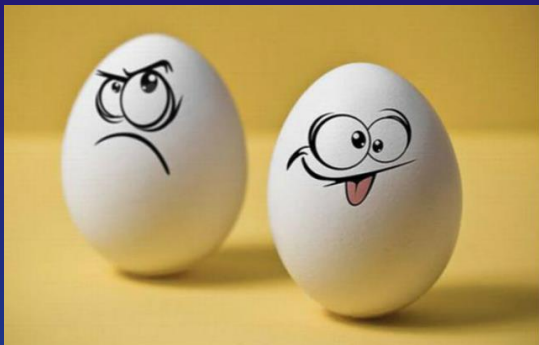
時間 (課程與課時)

03

早前疫情對學生的影響



學生感想



親身體驗科學探究，感覺有趣
拉近科學與自己的生活
感覺到科學探究的「專業」

老師感想與得著

01 擔心…

02 放心…

03 驚喜…

04 展望…





感謝

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中華聖潔會靈風中學