

HOW TO PICK A LOCK

S.T.E.M. Kit



WITT STEM Kit

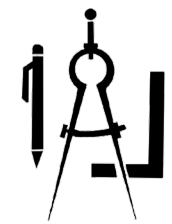
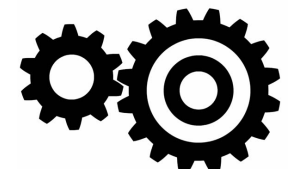
Lockpicking

- Introduction
- Curriculum Points
- Kit Components
- Why is it important?
- Lockpicking vs. Hacking
- Inside a Lock
- Lock Picking Tools
- How it Works
- Going Forward



What is STEM?

- STEM stands for Science, Technology, Engineering and Mathematics
- The aim of STEM is the integration of these four disciplines together in teaching and learning. As, in the real world, these four disciplines rely heavily and seamlessly on each other.
- STEM helps strengthen key life skills such as analytical thinking, problem solving, creativity, teamwork and technical skills



What is WiTT?

- WiTT stands for Women in Technology and Trades
- WiTT is a group that increases opportunities and supports for women in technology and trades in all fields, through a rich networking and support community
- WiTT welcomes industry, staff, students and faculty across all areas of the college and all genders, backgrounds, races and orientation to become involved and contribute to the support of women in technology and/or trades.



Curriculum Points



Grade 10, Communications Technology – Part C2 - Technology and Society, Page 55
C2.4 describe legal concepts and issues relating to communications technology and media production



Grade 10, Communications Technology – Part C2.5 describe social and ethical issues relating to the use of communications technology.



Grade 10, Computer Technology – Part C2 – Technology and Society, Page 61 C2.1 identify some of the effects of the development of computer technology on society



Grade 10, Computer Technology – Part D1. Health and Safety - D1.2 identify issues related to Internet safety and personal identity security



Grade 10, Computer Technology – Part D2. Ethics and Security - D2.1 demonstrate an understanding of the importance of ethical computer use - D2.2 comply with acceptable-use policies



Grade 11, Technological Education Computer Technology - Part C2 - Technology and Society, Page 81
C2.2 Describe some of the drawbacks of computer and electronic technology for society



Grade 11, Technological Education Computer Technology - Part D - Professional Practice and Career Opportunities, Page 82
D1. Health and Safety - D1.2 Describe issues related to Internet safety.



Curriculum Points



Grade 11, Technological Education Computer Technology - Part D2. Ethics and Security - D2.1 comply with acceptable-use policies for computers. - D2.3 explain the importance of passwords, security software updates, and protection of personal information and client data.



Grade 12, Technological Education Computer Technology - Part C2 – Technology and Society, Page 94
C2.2 Assess the drawbacks of computer and electronics technology for society.



Grade 12, Technological Education Computer Technology - Part D1. Health and Safety - D1.3 research and discuss issues related to Internet safety



Grade 12, Technological Education Computer Technology - Part D2. Ethics and Security - D2.1 describe the components of an acceptable use policy for computers - D2.3 explain the importance of computer security



Grade 12, Physics - Part C2. Developing Skills of Investigation and Communication - C2.1 use appropriate terminology related to mechanical systems



Grade 12, Physics - Part C 2.2 analyse, in qualitative and quantitative terms, the forces (e.g., frictional, tension) acting on an object

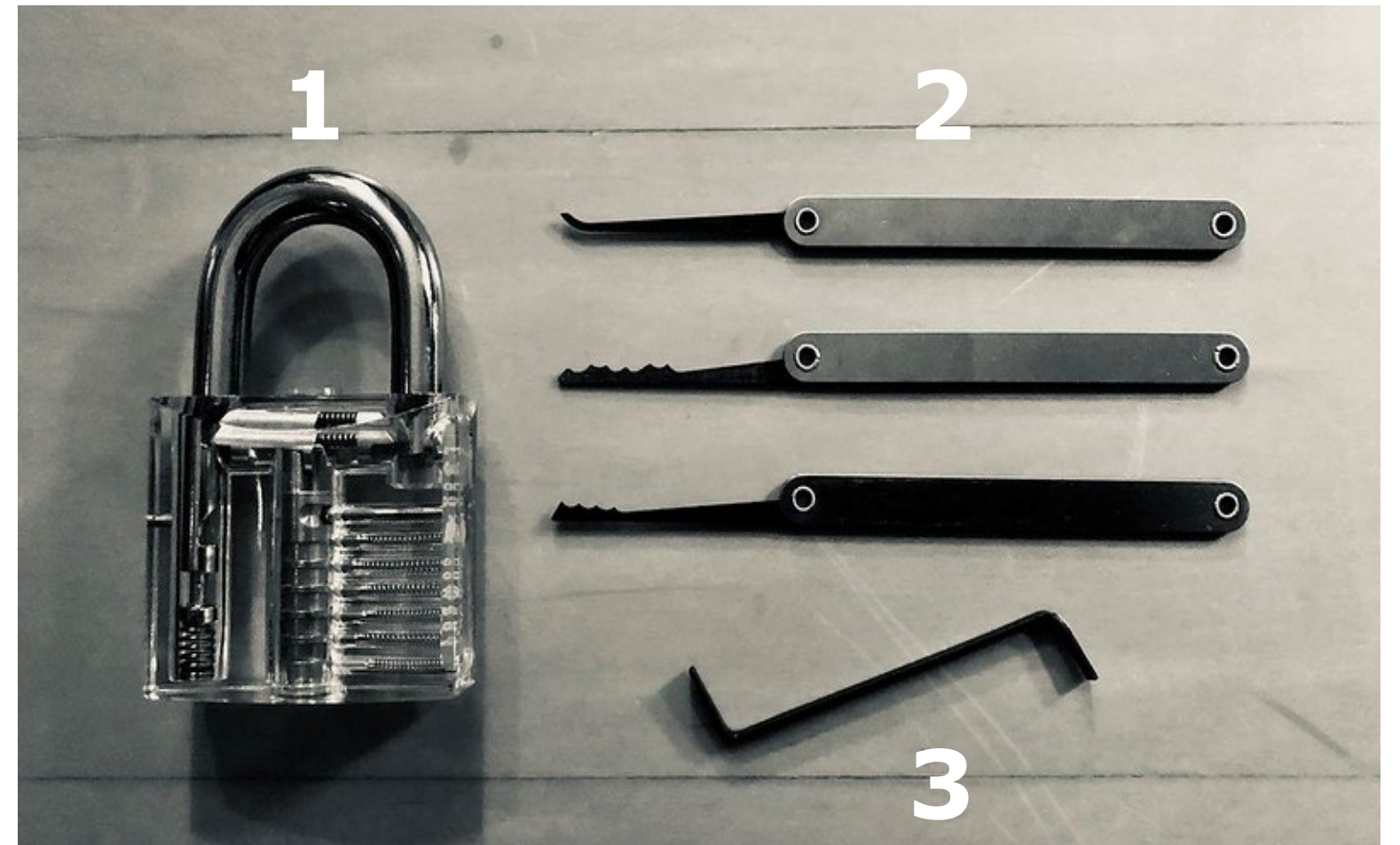


Grade 12, Physics - C2.4 use an inquiry process to determine the relationships between force, distance, and torque for the load arm and effort arm of levers.



KIT COMPONENTS

- 1 Padlocks with different numbers of pins.
- 2 Hook Picks: different forms, size and thickness
- 3 Tension wrench



WHY IS IT IMPORTANT ?

- Something is locked when it needs to be protected or secured. The access is restricted from unwanted intruders.
- **Lock picking** is the technique to open a lock without a key.
- Similarly in a digital world it can be compared with cyber threats when hackers have access to computers without permission.



LOCK PICKING



- Open a lock without keys
- Picking a lock requires practice and tools such as tension wrenchs and hooks to mimic a key.
- The number of pins will increase the difficulty for lock picking thus the security level.

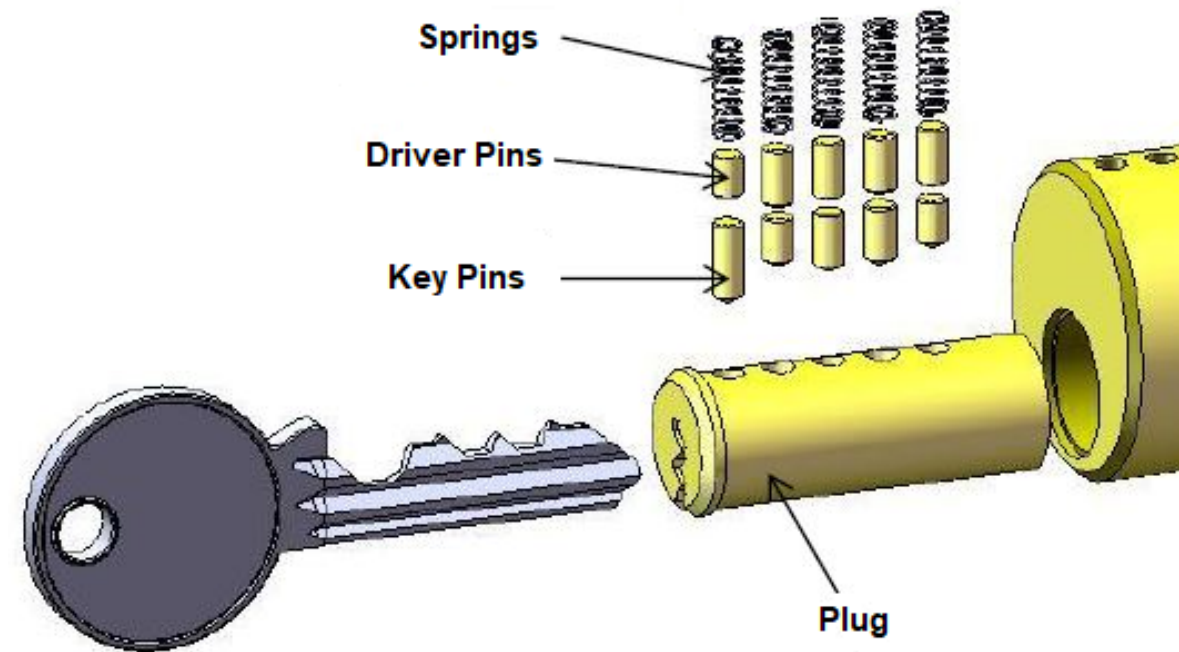
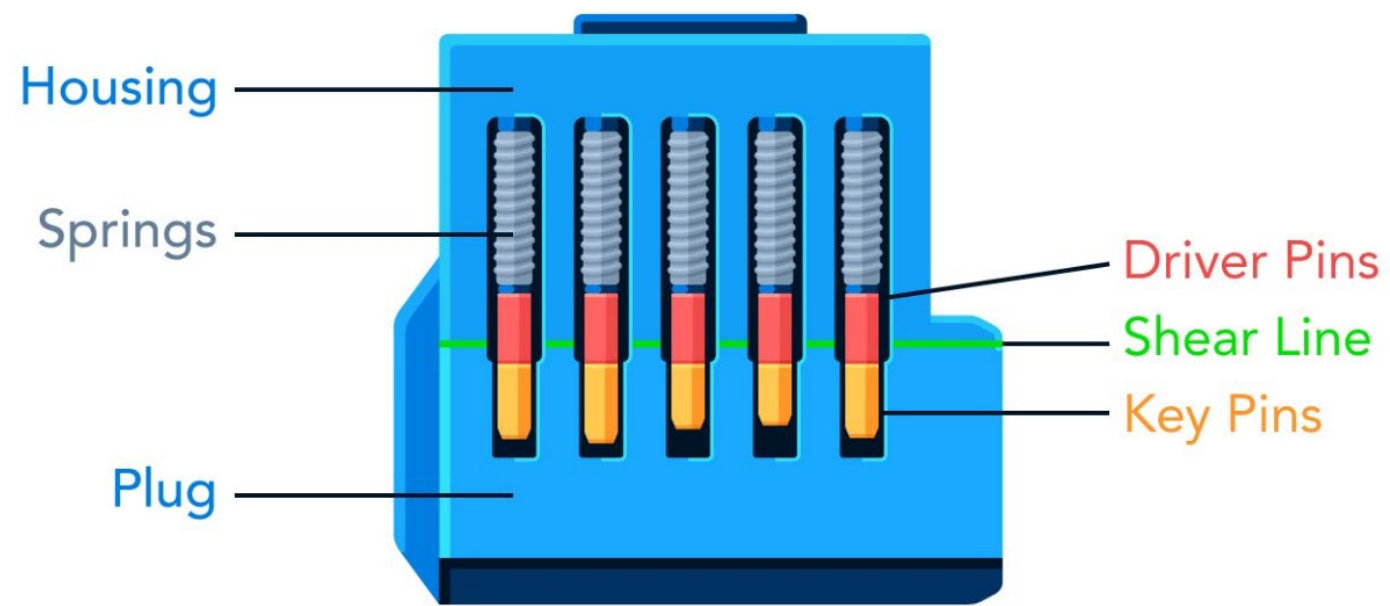
HACKING



- Break into digital devices without permission and have access to data
- It is required use digital techniques and malicious cyberattacks to unlock computers' systems.
- Improving the security with firewalls, antivirus, encryption among others will prevent from attacks.



INSIDE A LOCK

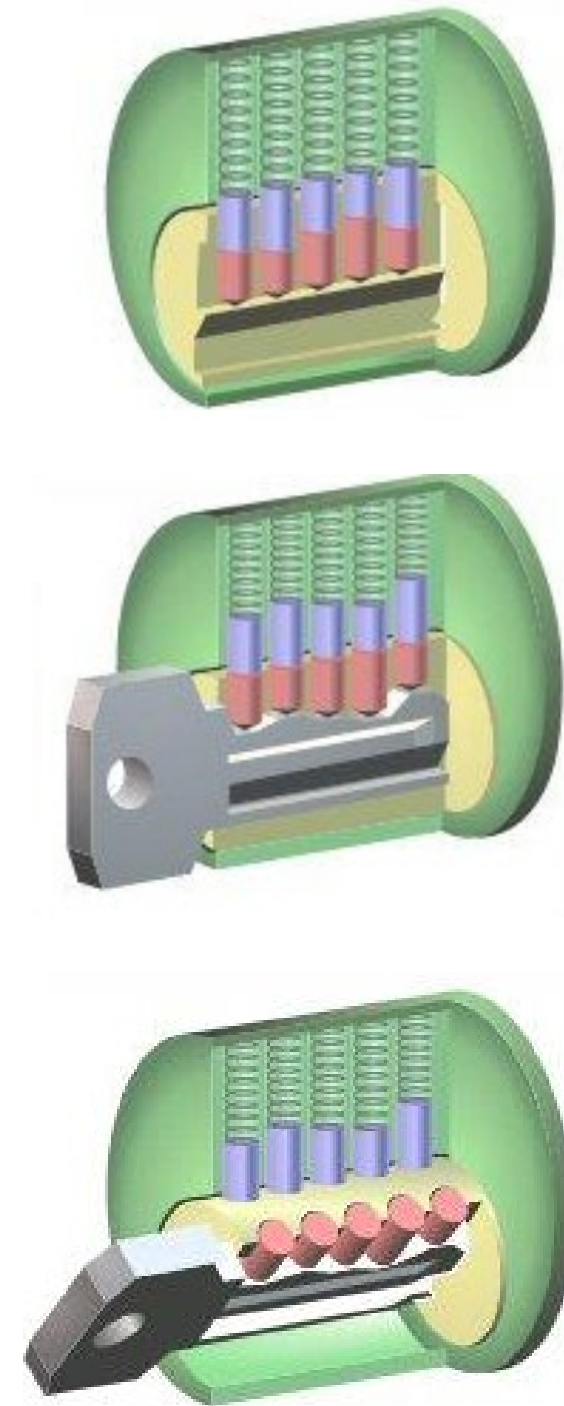


- Locks are mechanisms that uses pins and springs to prevent from opening it without a key.



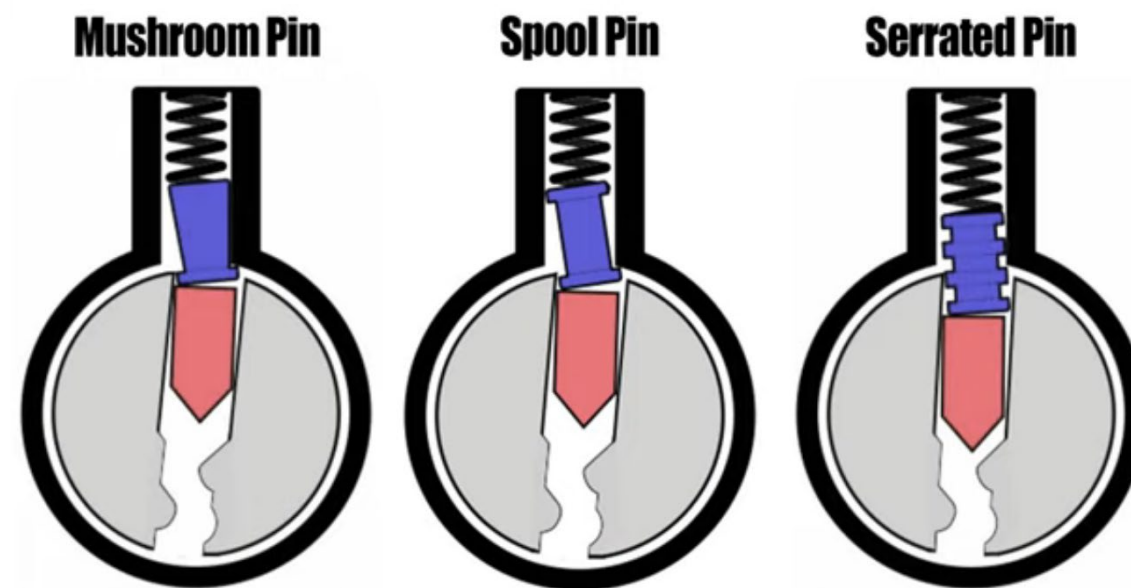
INSIDE A LOCK

- Main purpose: is to lift all the bottom pins called “Key Pins” to align them to the Shear Line which is the boundary between the plug and housing.
- A key entering into the keyway will be aligned with the bottom pins of the lock reaching the shear line, the plug will be released and rotates for opening the lock.



INSIDE A LOCK

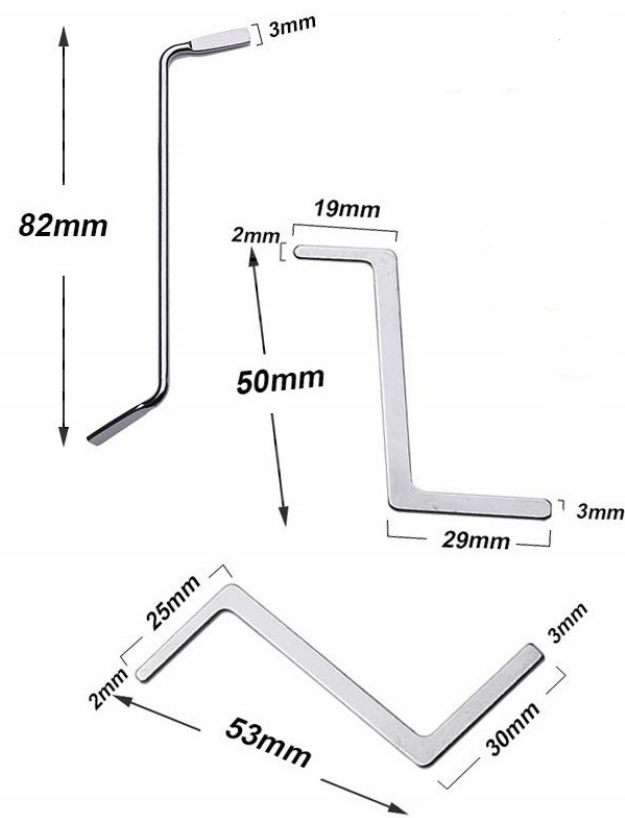
- Minor changes in the components of the lock can increase the security such as: different number of pins or the shape of pins among others.



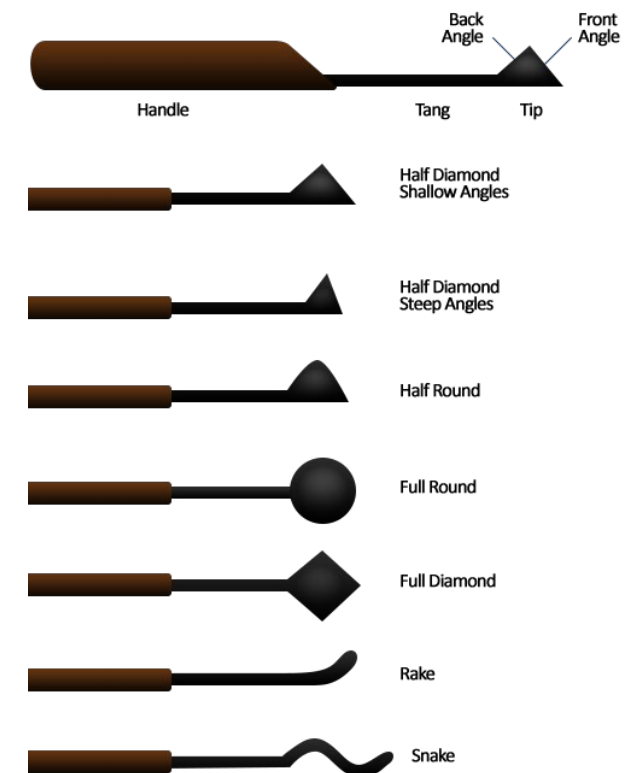
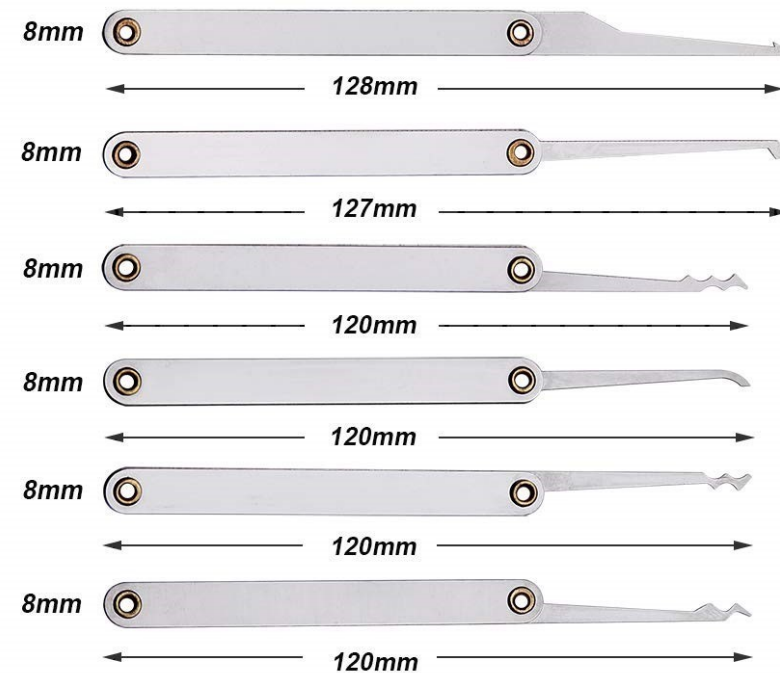
LOCK PICKING TOOLS

Lockpicks are the tools to manipulate the pins in a lock

TENSION WRENCH

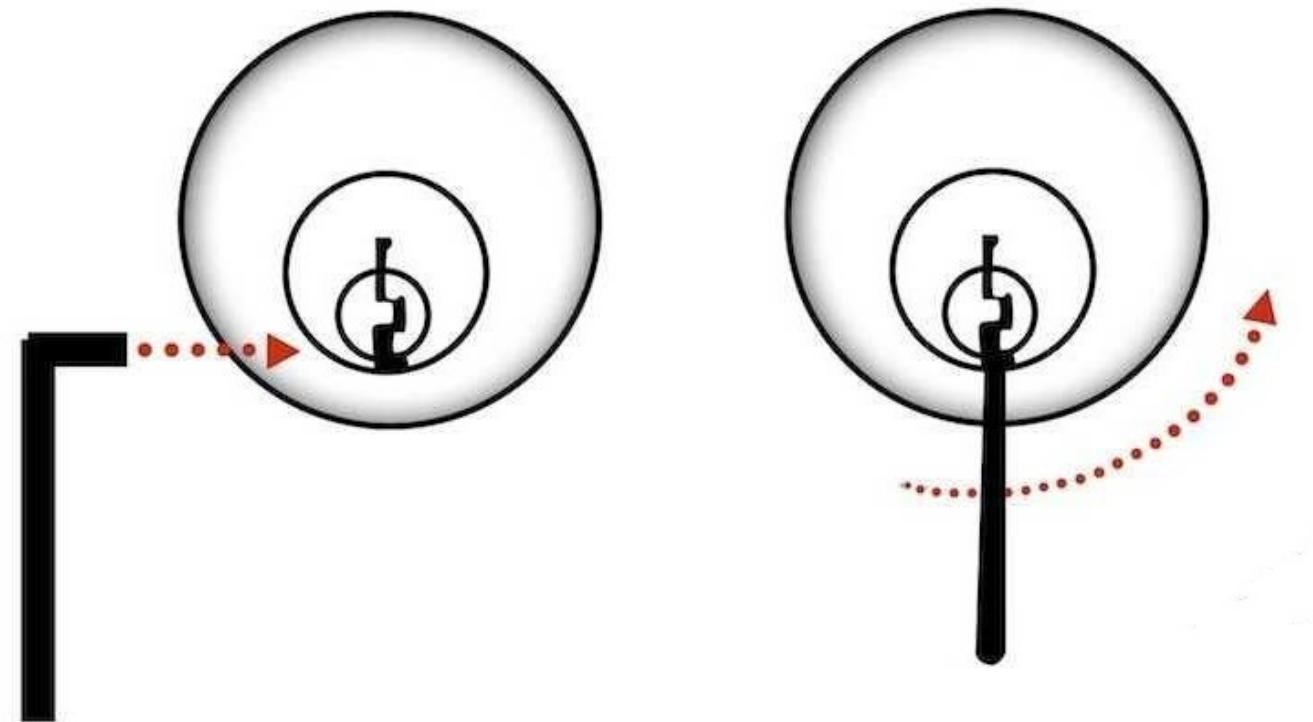


HOOK PICKS / RAKES



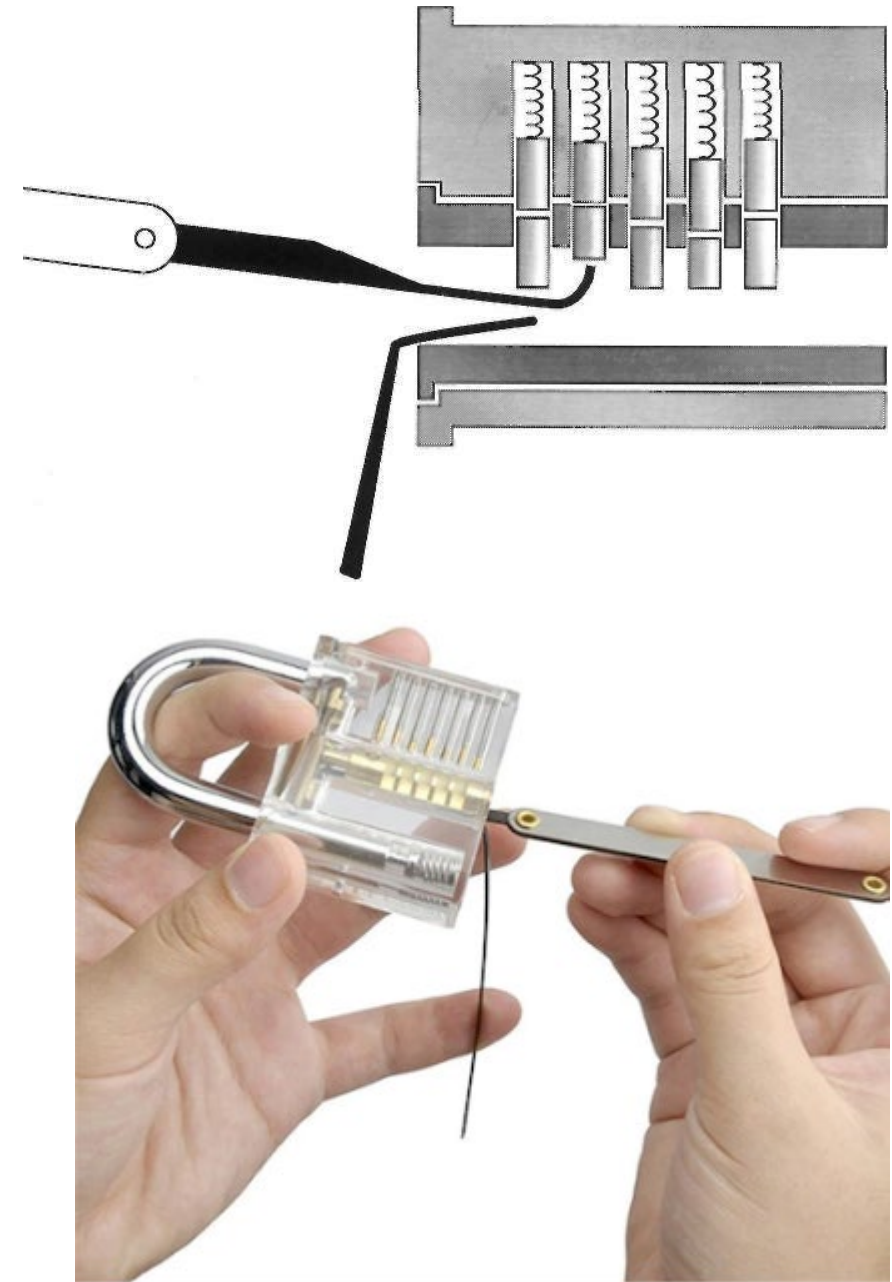
HOW IT WORKS ?

- Insert a wrench (shorter side) into the bottom edge of the keyhole.
- Apply slight tension on the longer end of the wrench and turn it in the same direction as a key would do it (left or right) and keep it tensioned with one hand in that way.



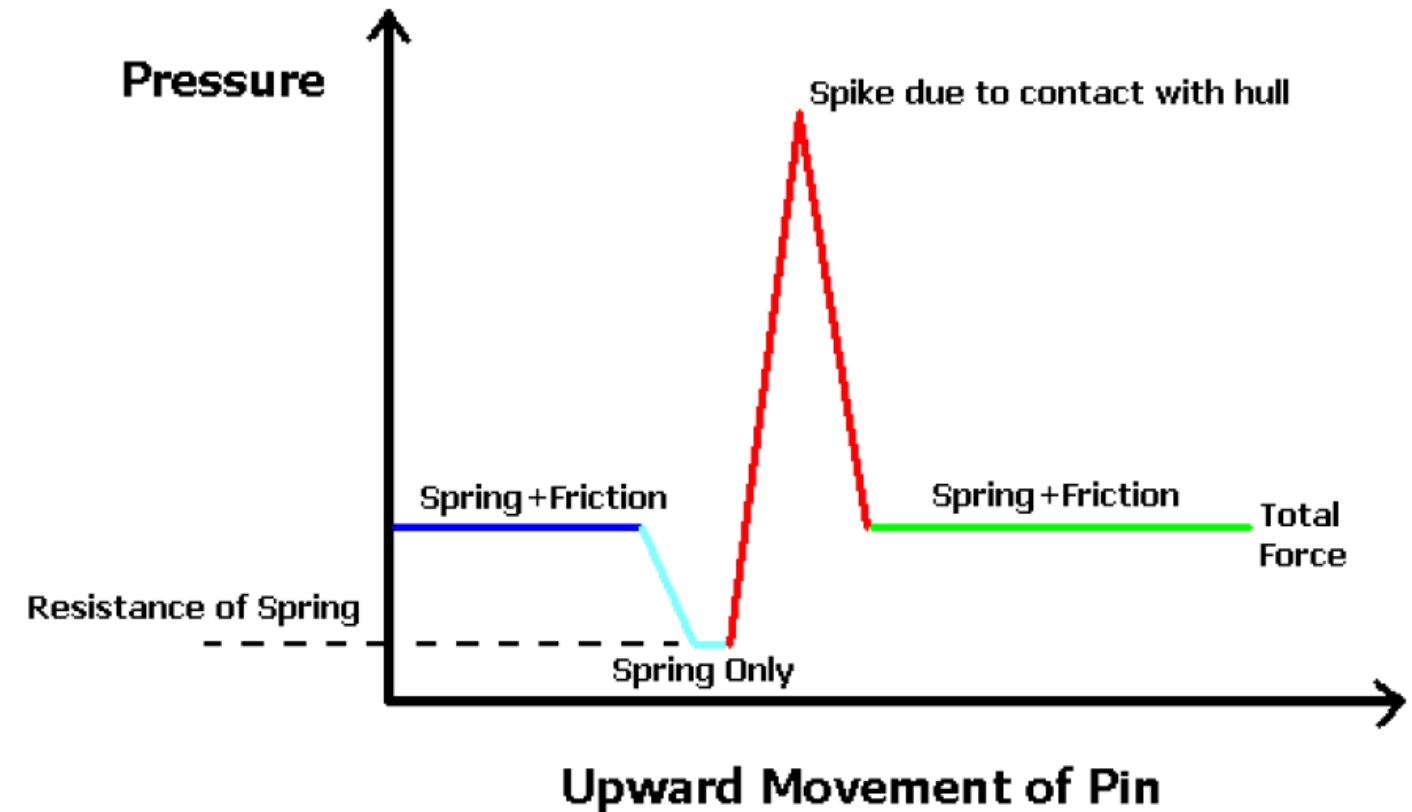
HOW IT WORKS ?

- Once the tension is applied insert the hook pick or rake into the top edge of the keyhole.
- Move it up and down in the keyway trying each pin at a time until hear a "click".



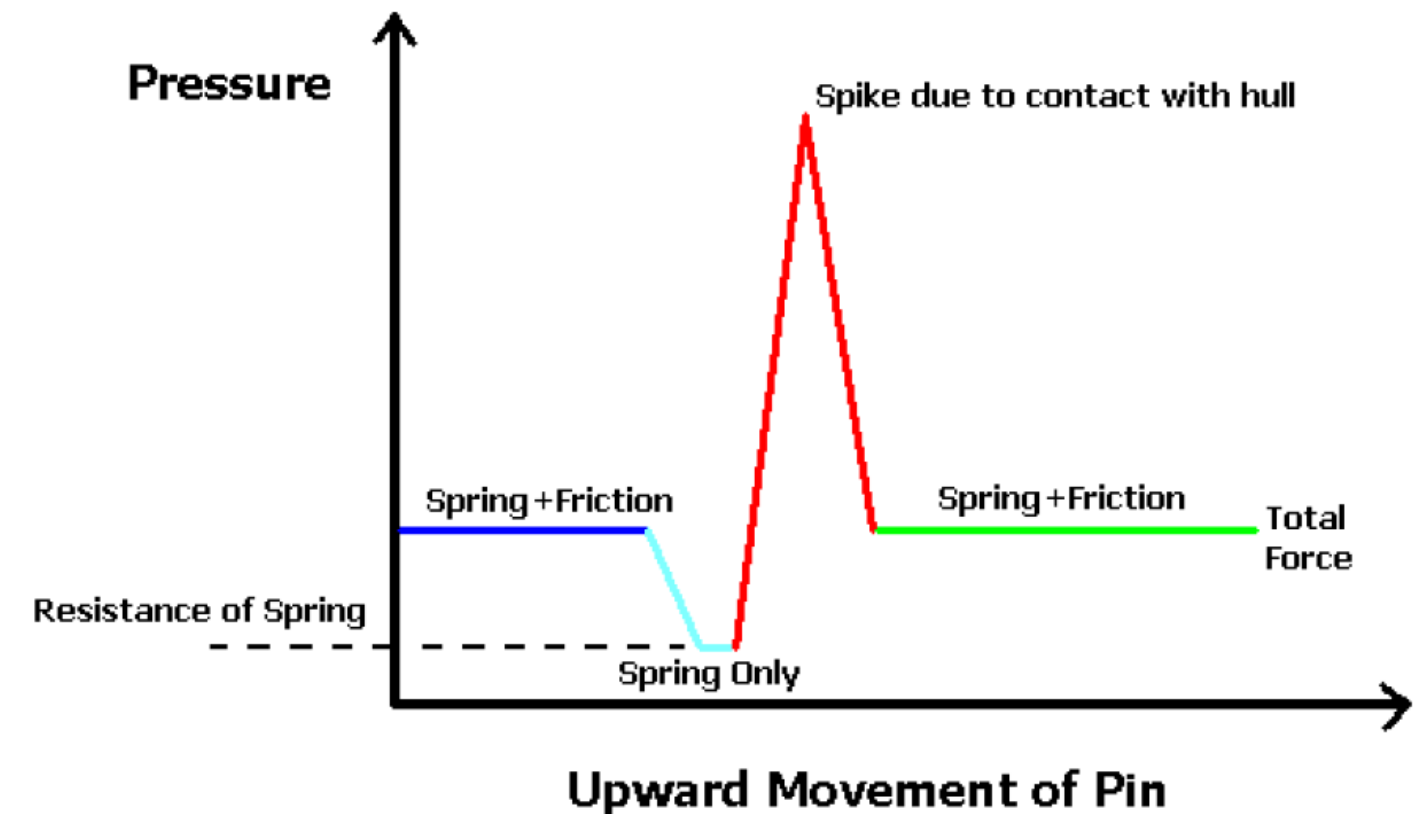
HOW IT WORKS ?

- During the process of lock picking there are some stages where Torque, Friction and Resistance are present.
- At the beginning (blue line) there is resistance from the springs and the rotational force on the plug applied by the wrench.



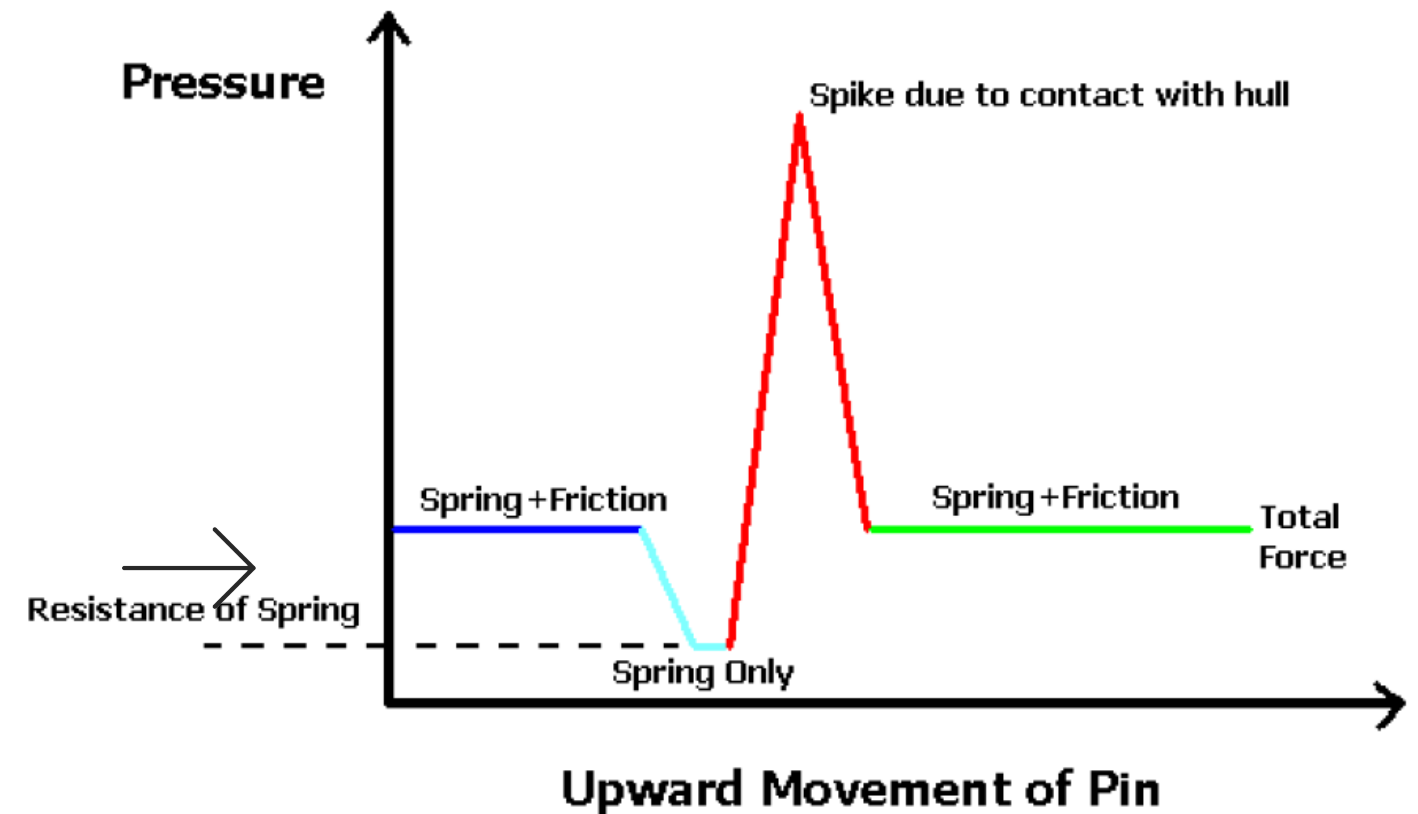
HOW IT WORKS ?

- When a bottom pin is pressed upwards attempting to reach the shear line, there is a slight resistance only from the spring force. (cyan line)
- Then a contact force shows up (red line) when the pin jabs into the housing (hull). There is a resistance peak.



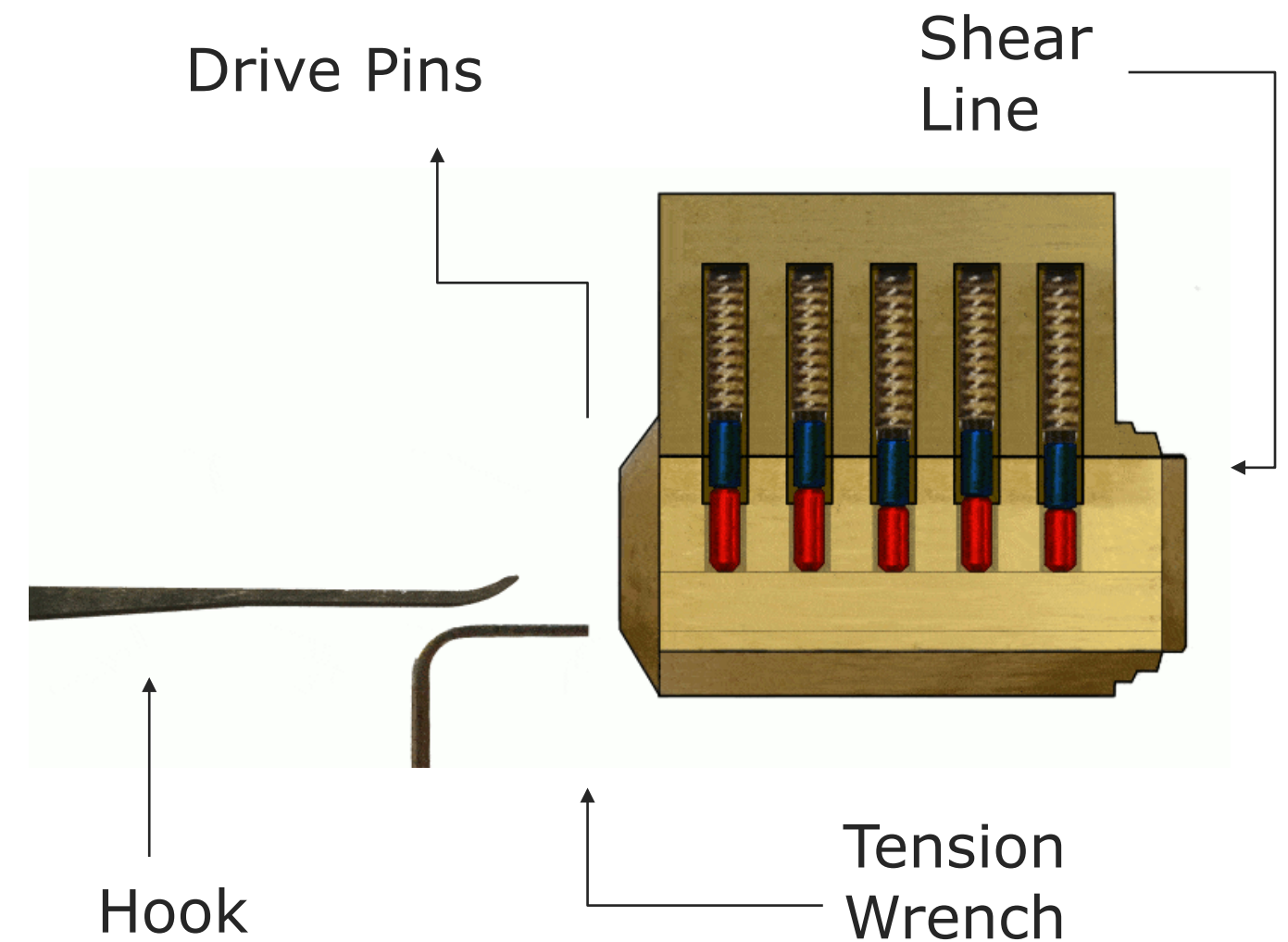
HOW IT WORKS ?

- Once the pin reach the shear line and stand still, the resistance peak is passed but a new friction point is established similar to the resistance from the beginning. (green line)



HOW IT WORKS ?

- The pins need to be forced upward aiming to align them in the shear line.
- This movement can be done randomly, but it is recommended start from the last pin and go forward.
- You can “feel” each pin individually as it is lifted up and a click is heard.



HOW IT WORKS ?

- The spring force will increase as the pins are pushed into the housing of the lock.
- Once the upper pin sets at the shear line the resistance disappears.
- Then turn the wrench ... and the Lock will open !



GOING FORWARD ?

This kit has high potential to be explored:

- Testing locks with different number of pins.
- Timing how long it takes to pick each lock.
- Using different tools to pick.
- Using different kind of locks.

Also it can be complemented with the HackStudent Virtual Micro-Learning Modules:

<https://www.mohawkcollege.ca/about-mohawk/cyber-security/science-technology-engineering-and-math-stem-learning-resources>



WHERE TO BUY IT

Here some links where to buy the components:

<https://www.lockpickworld.com/products/southord-14-piece-lock-pick-set-with-textured-grip-case>

<https://www.lockpickworld.com/products/dangerfield-serenity-picks>

https://www.amazon.ca/Three-Padlocks-Stainless-Steel-Tools/dp/B083V6PFTL/ref=sr_1_27?crid=2B9RKTQF43Z3P&dchild=1&keywords=lock+picking+set+beginner&qid=1598570792&s=hi&sprefix=Lock+Picking+Set+begi%2Ctools%2C180&sr=1-27

<https://www.ebay.ca/itm/15PCS-24PCS-Lock-Unlocking-Picking-Set-With-3-Transparent-Practice-Training-Lock/392914524624?hash=item5b7b87d9d0:g:gpMAAOSwmAJfHpnK&var=661821677281>





THANK YOU !

For more S.T.E.M. learning resources or additional information please visit our website.



<https://www.mohawkcollege.ca/about-mohawk/cyber-security/science-technology-engineering-and-math-stem-learning-resources>

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